ORDER NO. MAC9609040C2

Service Manual

Room Air Conditioners

CS-G90KE / CU-G90KE
CS-G120KE / CU-G120KE

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Panasonic

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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Features

• Product

– Powerful Mode for quick cool/heat
– Compressor operating frequency control to maintain desired room temperature
– Automatic Restart after power failure
– Battery weak indication mark at remote control
– Washable front panel
– Power Monitor Display

• Serviceability

– Self diagnosis
– Test Run at both Cooling and Heating rated frequency

• Quality Improvement

– High power supply voltage protection
– Low power supply voltage protection
– Gas leakage detection

Functions

Remote Control

OFF / ON ⏻

Operation OFF / ON

MODE

Operation Mode Selection

- AUTO Automatic Operation Mode
- HEAT Heating Operation Mode
- COOL Cooling Operation Mode
- DRY Soft Dry Operation Mode
- FAN Fan Operation Mode

POWERFUL

Powerful Mode Operation

FAN SPEED

Indoor Fan Speed Selection

- Low
- Medium⁻
- Medium
- Medium⁺
- High
- AUTO FAN Automatic Fan Speed

AIR SWING

Airflow Direction Control

- AIR SWING AUTO Automatic Airflow Direction Control
- AIR SWING Airflow Direction Manual Control

TEMP.

Room Temperature Setting

- Temperature Setting (16˚C to 30˚C).

ON-TIMER
OFF-TIMER

Timer Operation Selection

- 24-hour, OFF / ON Real Timer Setting.

∨
∧

Time / Timer Setting

- Hours and minutes setting.

SET
CANCEL

Timer Operation Set / Cancel

- ON Timer and OFF Timer setting and cancellation.

CLOCK

Clock Setting

- Current time setting.

SLEEP

Sleep Mode Operation OFF / ON

Battery Indication

- Battery mark "▭" blinks when the batteries should be replaced.

Functions

Indoor Unit

FOR ALL OPERATIONS

POWER ⏻

Power Switch OFF / ON ⏻

AUTO
OFF / ON

Automatic Operation Switch

- Used when the remote control cannot be used.

Remote Control Signal Receiving Sound Control OFF/ON ※

- It can be controlled by pressing Automatic Operation Switch for 10 seconds.

TEST RUN
OFF / ON

Test Run Operation

- Used when test running or servicing.
- Compressor operation: rated frequency
  Cooling: 72Hz (CS-G90KE), 78Hz (CS-G120KE)
  Heating: 92Hz (CS-G90KE), 98Hz (CS-G120KE)

Operation Indication Lamps

- POWER (Red) – Lights up in operation, blinks in Automatic Operation judging and Hot Start operation.
- TIMER (Orange) – Lights up in Timer Setting.
  Blinks in Self Diagnosis Control.
- SLEEP (Orange) – Lights up in Sleep Mode Operation.

Power Monitor Display ※

- Lights up during compressor operation.

Operation Mode

- Automatic, Heating, Cooling, Soft Dry and Fan Operation.

Automatic Restart Control ※

- Operation is restarted after power failure at previous setting mode.

Sleep Operation Mode ※

Timer Operation ※

Powerful Mode ※

- For quick cooling or heating

Indoor Fan Speed Control ※

Airflow Direction Control ※

Functions

- Room Temperature Control ※

Operation Mode	Compressor Operation Frequency	
	CS-G90KE	CS-G120KE
Cooling	25 – 83 Hz	25 – 94 Hz
Soft Dry	25 – 36 Hz	25 – 38 Hz
Heating	25 – 118 Hz	25 – 118 Hz

- Temperature Shift ※
- Self Diagnosis ※
- Low Pressure Control ※ (Gas Leakage Detection)
- High Power Supply Voltage Protection ※
- Indoor Power Relay Control ※

COOLING/SOFT DRY OPERATION

- Deodorizing Control ※
- Sensible Heat Control ※
- Anti-Fog Discharge Control ※
- Anti-Dew Formation Control ※
- Anti-Freezing Control ※
- Quiet Operation ※

Functions

HEATING OPERATION

- Anti-Cold Draft Control ※
- Hot Start ※
- Intake Air Temperature Control ※
- High Pressure Control ※

AUTOMATIC OPERATION

FAN OPERATION

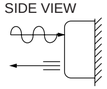
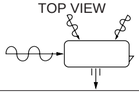
Functions

Outdoor Unit

- Outdoor Fan Motor
  - 6 poles induction motor, 1 speed.
- Time Delay Safety Control ※
- Forced Operation 30 seconds ※
- High Pressure Control ※ (For Cooling/Soft Dry)
- DC Peak ※
- DC Reset ※
- Total Running Current Control ※
- Compressor Overheating Protection ※
- Power Transistor Overheating Protection ※
- Low Frequency Operation Protection ※
- Minimum Frequency Operation Protection ※
- Outdoor Air Temperature Control ※
  - Detect outdoor ambient temperature and limits compressor operating frequency

※ Details can be refered to OPERATION DETAIL in this manual.

Product Specifications

			Unit	CS-G90KE	CU-G90KE
Cooling Capacity			kW Btu/h	2.6 (0.88 - 2.90) 8,800 (3,000 - 9,900)	
Heating Capacity			kW Btu/h	3.6 (0.78 - 4.80) 12,200 (2,600 - 16,300)	
Moisture Removal			ℓ/h Pint/h	1.6 3.4	
Power Source			Phase V Cycle	Single 230 50	
Airflow Method			OUTLET INTAKE	SIDE VIEW 	TOP VIEW 
Air Volume	Indoor Air (Lo)		m^3/min (cfm)	Cooling ; 6.4 (226) Heating ; 6.4 (226)	–
	Indoor Air (Me)		m^3/min (cfm)	Cooling ; 7.2 (254) Heating ; 7.2 (254)	–
	Indoor Air (Hi)		m^3/min (cfm)	Cooling ; 8.3 (293) Heating ; 9.4 (332)	–
	Outdoor Air		m^3/min (cfm)	–	23.5 (830)
Noise Level			dB (A)	Cooling ; High 38, Low 30 Heating ; High 39, Low 30	Cooling ; 46 Heating ; 47
Electrical Data	Input		kW	Cooling ; 0.88 (0.29 - 1.01) Heating ; 1.11 (0.275 - 1.44)	
	Running Current		A	Cooling ; 4.3 (max. 4.7) Heating ; 5.0 (max. 6.5)	
	COP		W/W	Cooling ; 3.0 Heating ; 3.2	
	Starting Current		A	6.5	
Piping Connection Port (Flare piping)			inch inch	G ; Half Union 3/8" L ; Half Union 1/4"	G ; 3-way valve 3/8" L ; 2-way valve 1/4"
Pipe Size (Flare piping)			inch inch	G (gas side) ; 3/8" L (liquid side) ; 1/4"	G (gas side) ; 3/8" L (liquid side) ; 1/4"
Drain Hose	Inner diameter		mm	12	–
	Length		m	0.7	–
Power Cord Length Number of core-wire				2.1 m 3 core wires × 1.0 mm^2	– –
Dimensions		Height	inch (mm)	11-7/16 (290)	19-29/32 (505)
		Width	inch (mm)	31-15/32 (799)	30-23/32 (780)
		Depth	inch (mm)	6-29/32 (175)	9-21/32 (245)
Net Weight			lb (kg)	18 (8.0)	86 (39)
Compressor		Type		–	Rotary (1 cylinder) rolling piston type
	Motor	Type		–	Induction (2-poles)
	Rated	Output	W	–	500
Air Circulation		Type		Cross-flow Fan	Propeller Fan
		Material		AS + Glass Fiber 30%	AES + Glass Fiber 12%
	Motor	Type		Transistor (4-poles)	Induction (6-poles)
		Input	W	–	34
		Rated Output	W	20	20
	Fan Speed	Low	rpm	1,000	–
		Medium	rpm	1,120	–
		High (Heating)	rpm	1,300 (1,460)	675

CS-G90KE CS-G90KE

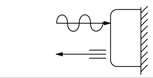
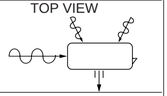
Product Specifications

		Unit	CS-G90KE	CU-G90KE
Heat Exchanger	Description		Evaporator	Condenser
	Tube material		Copper	Copper
	Fin material		Aluminium	Aluminium
	Fin Type		Slit Fin	Corrugated Fin
	Row / Stage		(Plate fin configuration, forced draft) 2/12	2/19
	FPI		18	15
	Size (W × H × L)	mm	600 × 252 × 25.4	646.2 × 482.6 × 44
Refrigerant Control Device			–	Capillary Tube
Refrigeration Oil		(c.c)	–	SUNISO 4GDID or ATMOS M60 (260)
Refrigerant (R-22)		g (oz)	–	800 (28.2)
Thermostat			Electronic Control	–
Protection Device			–	Electronic Control
Capillary Tube	Length	mm	–	Cooling ; 550, Heating ; 720
	Flow Rate	ℓ/min	–	Cooling ; 12.5, Heating ; 5.8
	Inner Diameter	mm	–	Cooling ; 1.5 , Heating ; 1.2
Air Filter	Material Style		P.P. Honeycomb	–
Capacity Control			Capillary Tube	
Fan Motor Capacitor		μF, VAC	–	1.2 μF, 400 VAC

• Specifications are subject to change without notice for further improvement.

CS-G90KE CS-G90KE

Product Specifications

			Unit	CS-G120KE	CU-G120KE
Cooling Capacity			kW Btu/h	3.45 (1.06 - 3.85) 11,700 (3,600 - 13,100)	
Heating Capacity			kW Btu/h	4.80 (0.98 - 6.10) 16,300 (3,300 - 20,800)	
Moisture Removal			ℓ/h Pint/h	2.0 4.2	
Power Source			Phase V Cycle	Single 230 50	
Airflow Method			OUTLET INTAKE	SIDE VIEW 	TOP VIEW 
Air Volume	Indoor Air (Lo)		m^3/min (cfm)	Cooling ; 7.4 (261) Heating ; 7.6 (268)	–
	Indoor Air (Me)		m^3/min (cfm)	Cooling ; 8.1 (286) Heating ; 8.3 (293)	–
	Indoor Air (Hi)		m^3/min (cfm)	Cooling ; 9.3 (328) Heating ; 9.8 (346)	–
	Outdoor Air		m^3/min (cfm)	–	26.4 (930)
Noise Level			dB (A)	Cooling ; High 41, Low 37 Heating ; High 41, Low 37	Cooling ; 49 Heating ; 51
Electrical Data	Input		kW	Cooling ; 1.24 (0.355 - 1.53) Heating ; 1.70 (0.34 - 2.10)	
	Running Current		A	Cooling ; 5.5 (max. 6.7) Heating ; 7.5 (max. 9.1)	
	COP		W/W	Cooling ; 2.8 Heating ; 2.9	
	Starting Current		A	9.1	
Piping Connection Port (Flare piping)			inch inch	G ; Half Union 1/2" L ; Half Union 1/4"	G ; 3-way valve 1/2" L ; 2-way valve 1/4"
Pipe Size (Flare piping)			inch inch	G (gas side) ; 1/2" L (liquid side) ; 1/4"	G (gas side) ; 1/2" L (liquid side) ; 1/4"
Drain Hose	Inner diameter		mm	12	–
	Length		m	0.7	–
Power Cord Length Number of core-wire				2.1 m 3 core wires × 1.5 mm^2	– –
Dimensions		Height	inch (mm)	11-7/16 (290)	19-29/32 (505)
		Width	inch (mm)	31-15/32 (799)	30-23/32 (780)
		Depth	inch (mm)	6-29/32 (175)	9-21/32 (245)
Net Weight			lb (kg)	18 (8.0)	92 (42)
Compressor		Type		–	Rotary (1 cylinder) rolling piston type
	Motor	Type		–	Induction (2-poles)
	Rated	Output	W	–	650
Air Circulation		Type		Cross-flow Fan	Propeller Fan
		Material		AS + Glass Fiber 30%	AES + Glass Fiber 12%
	Motor	Type		Transistor (4-poles)	Induction (6-poles)
		Input	W	–	70
		Rated Output	W	20	30
	Fan Speed	Low	rpm	1,200	–
		Medium	rpm	1,310	–
		High (Heating)	rpm	1,500 (1,550)	780

Product Specifications

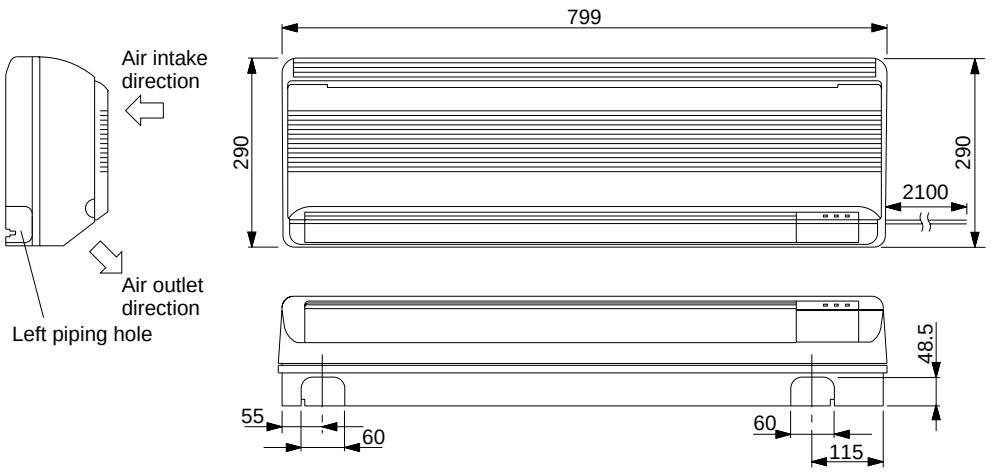
		Unit	CS-G120KE	CU-G120KE
Heat Exchanger	Description		Evaporator	Condenser
	Tube material		Copper	Copper
	Fin material		Aluminium	Aluminium
	Fin Type		Slit Fin	Corrugated Fin
	Row / Stage		(Plate fin configuration, forced draft) 2/12	2/19
	FPI		21	17
	Size (W × H × L)	mm	600 × 252 × 25.4	646.2 × 482.6 × 44
Refrigerant Control Device			–	Capillary Tube
Refrigeration Oil		(c.c)	–	SUNISO 4GDID or ATMOS M60 (270)
Refrigeration (R-22)		g (oz)	–	970 (34.2)
Thermostat			Electronic Control	–
Protection Device			–	Electronic Control
Capillary Tube	Length	mm	–	Cooling ; 880, Heating ; 535
	Flow Rate	ℓ/min	–	Cooling ; 6.75, Heating ; 15.0
	Inner Diameter	mm	–	Cooling ; 1.2, Heating ; 1.6
Air Filter	Material		P.P.	–
	Style		Honeycomb	–
Capacity Control			Capillary Tube	
Fan Motor Capacitor		μF, VAC	–	1.5 μF, 400 VAC

• Specifications are subject to change without notice for further improvement.

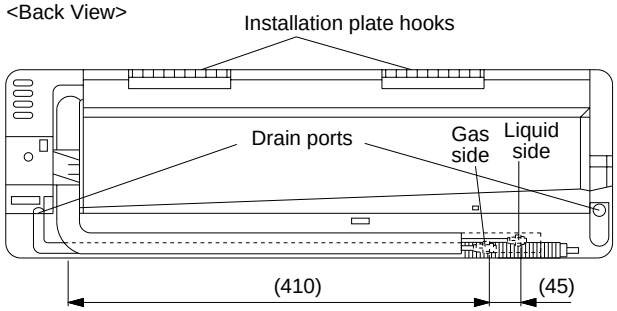
Dimensions

CS-G90KE / CS-G120KE

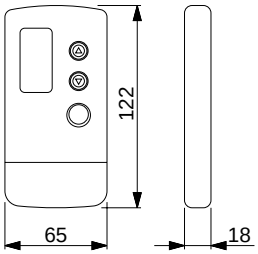
<Front View>



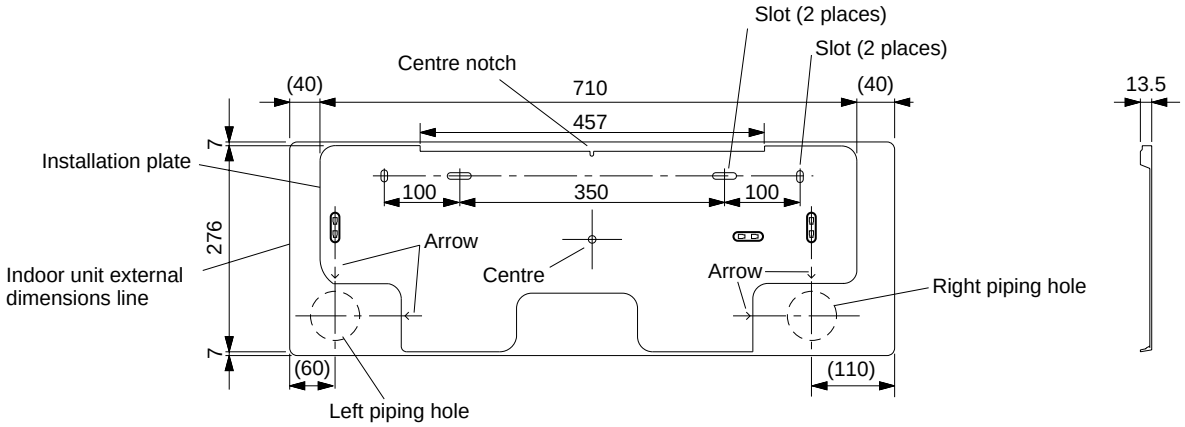
<Back View>



Remote control transmitter

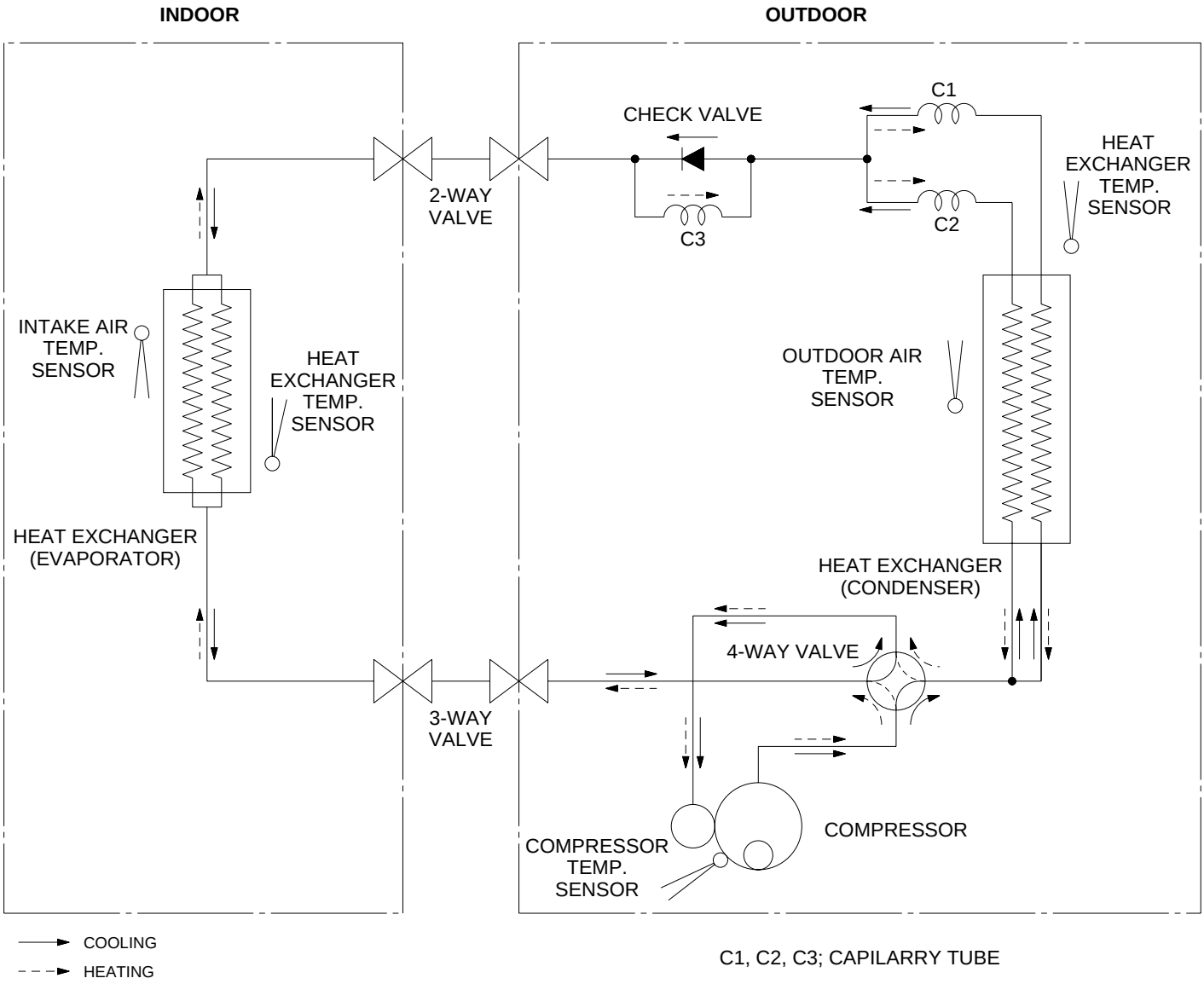


Relative position between the indoor unit and the installation plate <Front View>



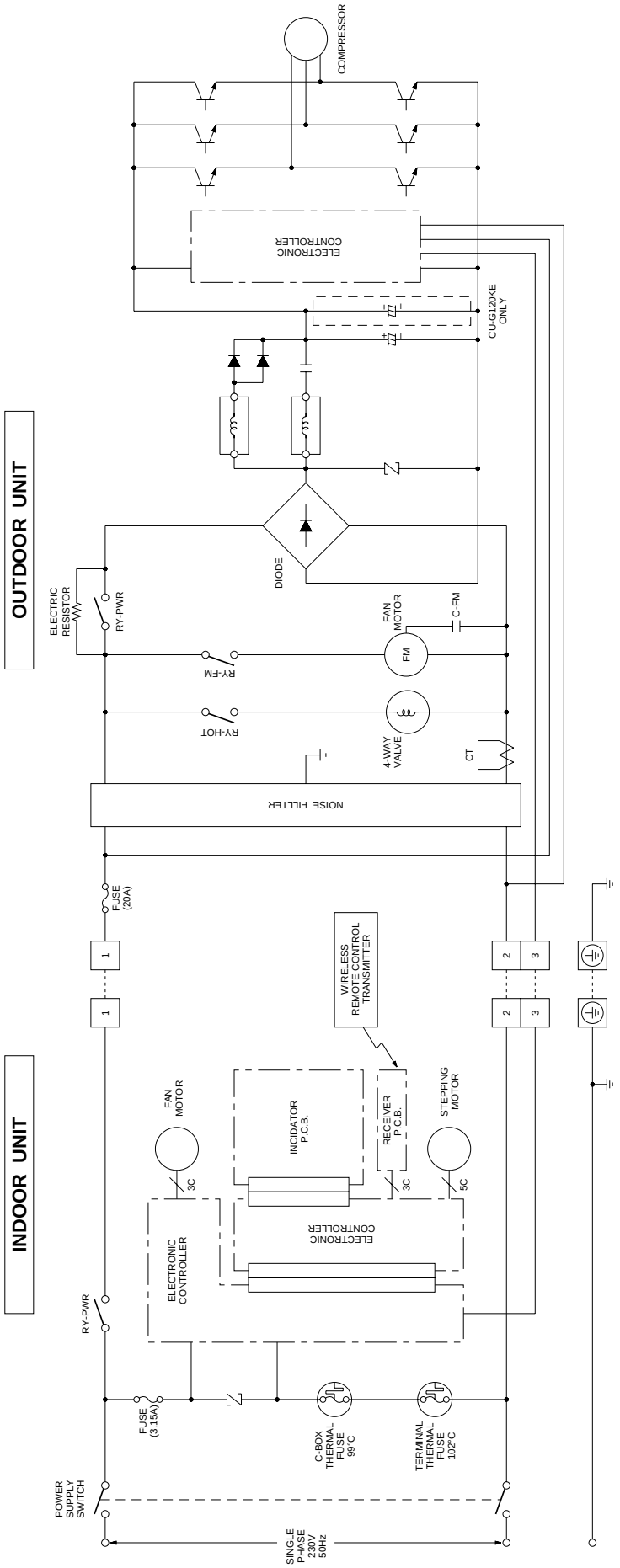
Refrigeration Cycle Diagram

CS-G90KE / CU-G90KE
CS-G120KE / CU-G120KE



Block Diagram

CS-G90KE / CU-G90KE
CS-G120KE / CU-G120KE

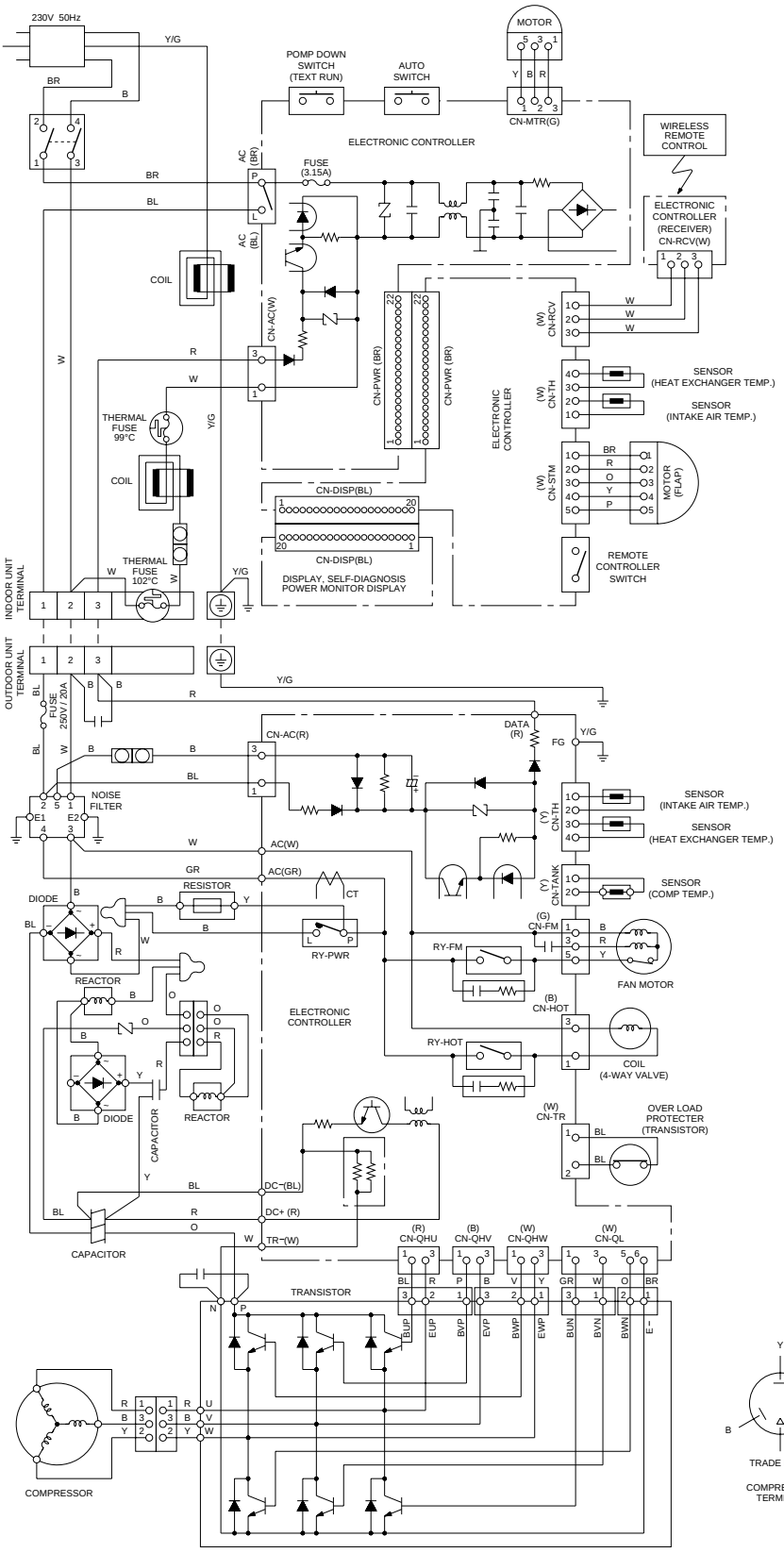


Indicates the electronic control unit.

"C" Indicates the number of core wires. (Example:5C=5 core wires).

Wiring Diagram

CS-G90KE / CU-G90KE



REMARKS:

B	:	BLUE
BR	:	BROWN
BL	:	BLACK
W	:	WHITE
R	:	RED
O	:	ORANGE
P	:	PINK
Y/G	:	YELLOW/ GREEN
GR	:	GRAY

Resistance of Outdoor Fan Motor Windings

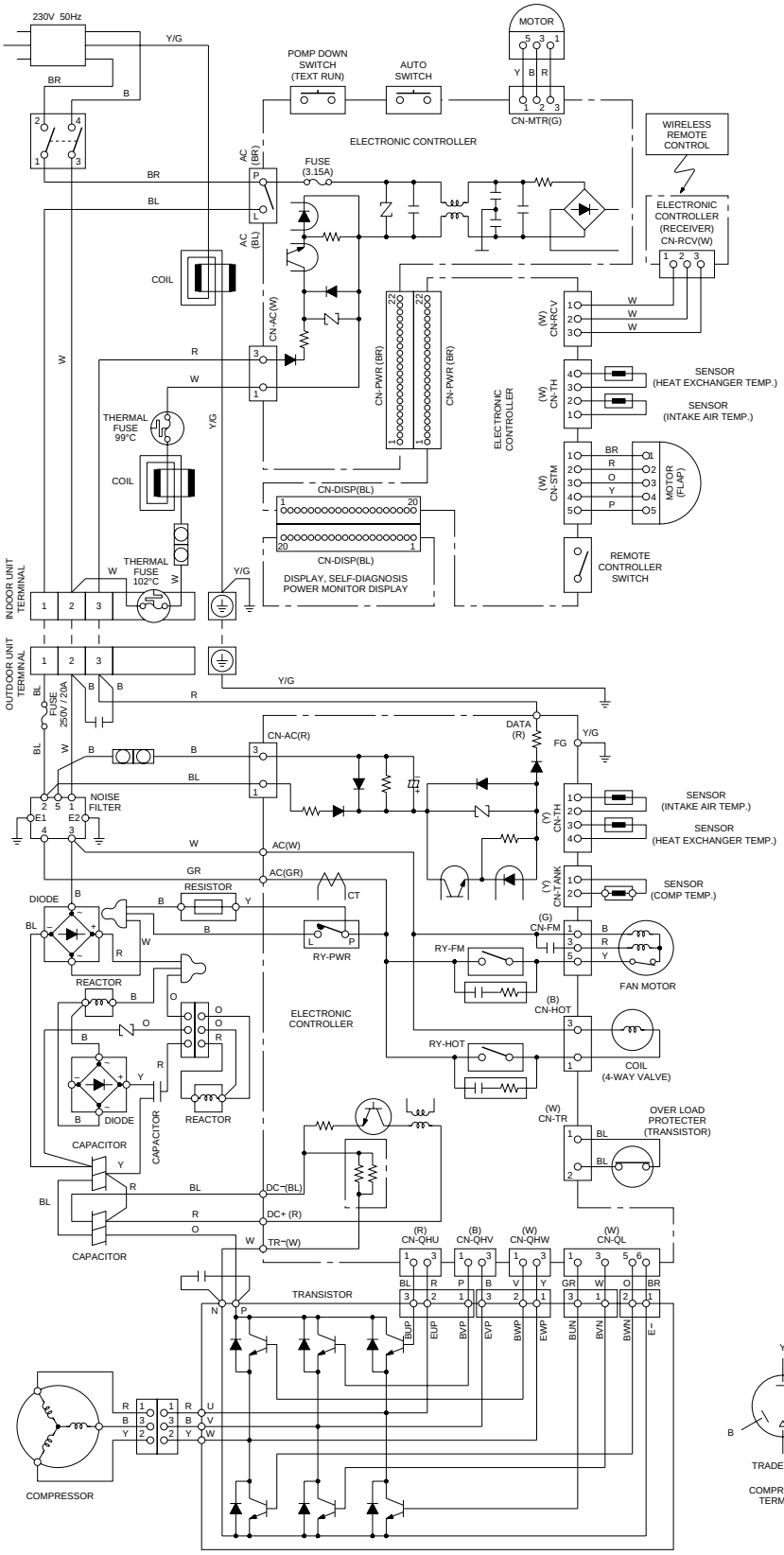
CONNECTION	CWA95341 (Ω)
BLUE - YELLOW	253
YELLOW - RED	322

Resistance of Compressor Windings

CONNECTION	2RV110N5DA02 (Ω)
U-V	1.0
U-W	1.0
V-W	1.0

Wiring Diagram

CS-G120KE / CU-G120KE



REMARKS:

B	:	BLUE
BR	:	BROWN
BL	:	BLACK
W	:	WHITE
R	:	RED
O	:	ORANGE
P	:	PINK
Y/G	:	YELLOW/ GREEN
GR	:	GRAY

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA95342 (Ω)
BLUE - YELLOW	161
YELLOW - RED	227

Resistance of Compressor Windings

CS-G120KE / CU-G120KE

CONNECTION	2PV132N5BA02 (Ω)
U-V	1.0
U-W	1.0
V-W	1.0

Operation Details

A. FUNCTIONS

1. TEMPERATURE SHIFT

Once the operation starts, the remote control setting temperature will be shifted internally based on the setting fan speed and outdoor air temperature. In addition, if Sleep Mode or Powerful Mode are set, the temperature shift will be carried out.

Setting of Internal Setting Temperature
The internal setting temperature can be decided as follows:

Remote control setting temperature
+
Outdoor temperature shift (refer Table a)
+
Fan speed shift (refer Table b)
+
Any Sleep Mode shift operation?
+
Any Powerful Operation shift? (refer Table c)
+
[Check upper/lower (33°C/16°C) limit for setting temperature]
↓
INTERNAL SETTING TEMPERATURE

Table a
Setting Temperature Shift based on outdoor air temperature.

(i) Cooling, Soft Dry

	Shift amount
38°C ≤ Outdoor air temperature	–0.5°C
30°C ≤ Outdoor air temperature < 38°C	0.0°C
23°C ≤ Outdoor air temperature < 30°C	+0.5°C
Outdoor air temperature < 23°C	+1.0°C

(ii) Heating

	Shift amount
21°C ≤ Outdoor air temperature	–1.5°C
17°C ≤ Outdoor air temperature < 21°C	–1.5°C
13°C ≤ Outdoor air temperature < 17°C	–1.0°C
9°C ≤ Outdoor air temperature < 13°C	–1.0°C
5°C ≤ Outdoor air temperature < 9°C	0.0°C
1°C ≤ Outdoor air temperature < 5°C	+1.0°C
–3°C ≤ Outdoor air temperature < 1°C	+1.0°C
Outdoor air temperature < –3°C	+1.5°C

Table b
Setting Temperature Shift based on fan speed.

Remote control setting fan speed	Cooling	Dry	Heating
Lo	+2.0°C	+2.5°C	+1.0°C
Me^-, Me, Me^+, Auto fan speed	+2.0°C		+1.0°C
Hi	+2.0°C		+0.5°C

Table c
Powerful Mode Shift.

	Cooling	Dry	Heating
Powerful	–4.0°C	–3.0°C	+6.0°C

Operation Details

2. COOLING OPERATION

A. Room Temperature Control

(i) When the remote control setting temperature is less than 24°C.

Cooling		Compressor Operation Frequency (Hz)			
Intake air temp. – Internal setting temp. (°C)	+1.5	83 (Fc max) or 72	83 (Fc max) or 72	94 (Fc max) or 78	94 (Fc max) or 78
	+1.0	57	68	64	70
	+0.5	48	48	48	48
Internal setting temp.	0	33	36	33	38
	–0.5	25	33	25	33
Compressor OFF temp.	–1.0	25	25	25	25
		Comp OFF	Comp OFF	Comp OFF	Comp OFF
Outdoor Air Temperature		Less than 38°C	38°C and above	Less than 38°C	38°C and above
Model No.		CS-G90KE		CS-G120KE	

(ii) When the remote control setting temperature is 24°C and above.

Cooling		Compressor Operation Frequency (Hz)			
Intake air temp. – Internal setting temp. (°C)	+1.5	83 (Fc max) or 72	83 (Fc max) or 72	94 (Fc max) or 78	94 (Fc max) or 78
	+1.0	57	57	64	64
	+0.5	48	48	48	48
Internal setting temp.	0	33	33	33	33
	–0.5	25	25	25	25
Compressor OFF temp.	–1.0	25	25	25	25
		Comp OFF	Comp OFF	Comp OFF	Comp OFF
Outdoor Air Temperature		Less than 38°C	38°C and above	Less than 38°C	38°C and above
Model No.		CS-G90KE			

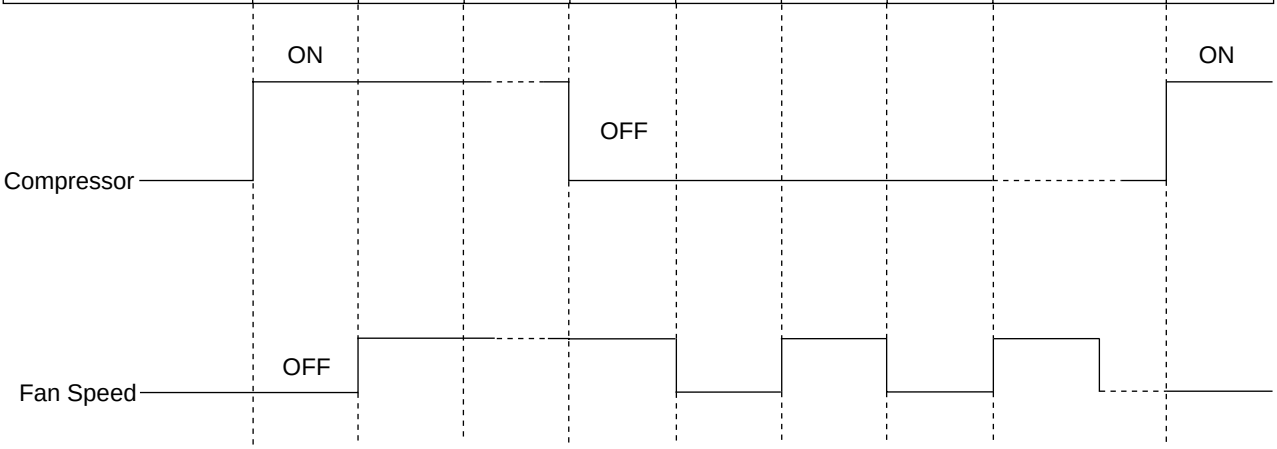
- Compressor OFF temperature = Compressor ON temperature.
- The operation frequency can be changed every 30 seconds.
- 30 minutes from the start of the operation, the compressor is operating at Fc max Hz.
- The compressor stops when the intake air temperature reaches 1°C below internal setting temperature and continues for 3 minutes.
- When the compressor stops, it will not begin operation for 3 minutes. (Time Delay Safety Control)
- When the intake air temperature reaches the Compressor ON temperature, the Compressor starts operation.
- When the compressor stops, the outdoor fan motor stops 30 seconds later.

Operation Details

B. Deodorizing Control

- This control is available during automatic fan speed for Cooling and Soft Dry Operation. It is not available during anti-freezing control.

Deodorizing Status	1	2	3	4	5	6	7	6, 7, 6, 7,...	1
Compressor	ON			OFF					ON
Time (second)	40	50		30	60	30	60	……	40
Fan Speed	OFF	SLo	Auto	SLo	OFF	SLo	OFF	……	OFF



- When the compressor is in operation, the deodorizing status starts from 1 → 2 → 3.
- When the compressor stops operation, the deodorizing status starts from 4 → 5 → 6 → 7.
- If the compressor still stops operation after 3 minutes, the deodorizing status will start from 6.

C. Sensible Heat Control

- This control is to improve the feeling in high fan speed during low operation frequency. When the operation frequency is less than 40Hz (CU-G90KE) or 43HZ (CU-G120KE), the fan speed will reduce. When the operation frequency is above 33Hz continuously for 5 minutes, the fan speed will resume to normal condition.

Operation Details

3. SOFT DRY OPERATION

A. Room Temperature Control

At the start of operation, cooling operation is running until the intake air temperature is 0.5°C higher than internal setting temperature, then the operation will shift to Soft Dry with indoor fan speed SLo.

Soft Dry	Compressor Operation Frequency (Hz)			
Intake air temp. – Internal setting temp. (°C)	Cooling Operation		Cooling Operation	
+1.5		36		38
+1.0		36		38
+0.5	33	33	33	33
Internal setting temp. 0	25	25	25	25
–0.5	25	25	25	25
Compressor OFF temp. –1.0	Comp OFF	Comp OFF	Comp OFF	Comp OFF
Condition	When the temperature falls	When the temperature rises	When the temperature falls	When the temperature rises
Model No.	CS-G90KE		CS-G120KE	

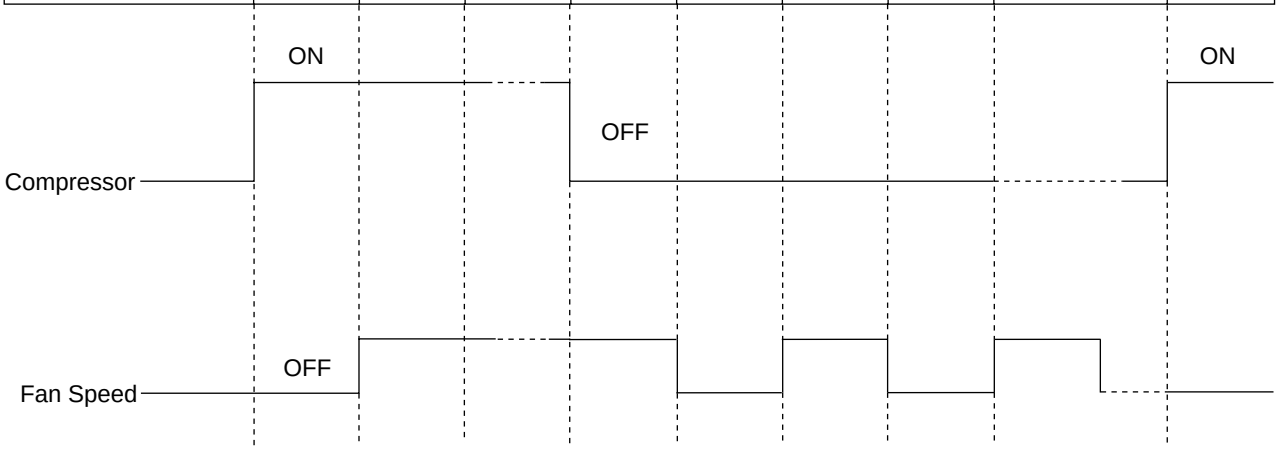
- Compressor OFF temperature = Compressor ON temperature.
- The operation frequency changes every 30 seconds.
- 30 minutes from the start of the operation, the compressor is operating at Fc max Hz.
- The Compressor stops when the intake air temperature reaches 1°C below internal setting temperature and continues for 3 minutes.
- When the Compressor stops, it will not begin operation for 3 minutes. (Time Delay Safety Control)
- When the intake air temperature reaches the Compressor ON temperature, the Compressor starts operation immediately.
- When the Compressor stops, the outdoor fan motor stops 30 seconds later.

Operation Details

B. Deodorizing Control

- This control is available during automatic fan speed for Cooling and Soft Dry Operation. It is not available during anti-freezing control.

Deodorizing Status	1	2	3	4	5	6	7	6, 7, 6, 7,...	1
Compressor	ON			OFF					ON
Time (second)	40	50		30	60	30	60	……	40
Fan Speed	OFF	SLo	SLo	SLo	OFF	SLo	OFF	……	OFF



- When the compressor is in operation, the deodorizing status starts from 1 → 2 → 3.
- When the compressor stops operation, the deodorizing status starts from 4 → 5 → 6 → 7.
- If the compressor still stops operation after 3 minutes, the deodorizing status will start from 6.

C. Sensible Heat Control

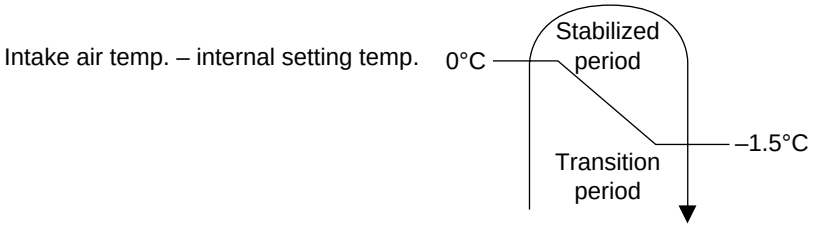
- This control is to improve the feeling in high fan speed and low operation frequency. When the operation frequency is less than 40Hz (CU-G90KE) or 43Hz (CU-G120KE), the fan speed will reduce. When the operation frequency is above 33Hz continuously for 5 minutes, the fan speed will resume to normal condition. (During Cooling operation).

Operation Details

4. HEATING OPERATION

A. Room Temperature Control

- During heating operation, the room temperature control depends on intake air temperature and internal setting temperature. Basically it can be divided into 2 periods as shown below:



(i) When indoor fan speed is Medium or above.

CS-G90KE

Heating Operation		Compressor Operation Frequency (Hz)						
		Transition Period	Stabilized Period					
Remote Control Setting Temp.		16°C ~ 30°C	16°C ~ 20°C		21°C ~ 25°C		26°C ~ 30°C	
Intake air temperature – Internal setting temperature		Comp Off	Comp Off	Comp Off	Comp Off	Comp Off	Comp Off	Comp Off
Compressor OFF	+1.5	25	25	25	25	25	25	25
	+1.0	25	33	33	40	33	40	33
	+0.5	36	36	36	55	36	55	36
Internal setting temp.	0	75	40	40	57	40	57	40
	–0.5	83	55	55	75	55	75	55
	–1.0	95	57	57	83	57	83	57
	–1.5	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)
Outdoor air temperature			Less than –1°C	–1°C and above	Less than –1°C	–1°C and above	Less than –1°C	–1°C and above

Operation Details

CS-G120KE

Heating Operation		Compressor Operation Frequency (Hz)						
		Transition Period	Stabilized Period					
Remote Control Setting Temp.		16°C ~ 30°C	16°C ~ 20°C		21°C ~ 25°C		26°C ~ 30°C	
Intake air temperature – Internal setting temperature		Comp Off	Comp Off	Comp Off	Comp Off	Comp Off	Comp Off	Comp Off
Compressor OFF	+1.5	25	25	25	25	25	25	25
	+1.0	25	33	33	43	33	43	33
	+0.5	38	38	38	55	38	55	38
Internal setting temp.	0	82	43	43	64	43	64	43
	–0.5	94	55	55	82	55	82	55
	–1.0	102	64	64	94	64	94	64
	–1.5	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)
Outdoor air temperature			Less than –1°C	–1°C and above	Less than –1°C	–1°C and above	Less than –1°C	–1°C and above

(ii) When indoor fan speed is lower than Medium

CS-G90KE

Heating Operation		Compressor Operation Frequency (Hz)						
		Transition Period	Stabilized Period					
Remote Control Setting Temp.		16°C ~ 30°C	16°C ~ 20°C		21°C ~ 25°C		26°C ~ 30°C	
Intake air temperature – Internal setting temperature		Comp Off	Comp Off	Comp Off	Comp Off	Comp Off	Comp Off	Comp Off
Compressor OFF	+1.5	25	25	25	25	25	25	25
	+1.0	25	36	36	40	36	40	36
	+0.5	36	40	40	55	40	55	40
Internal setting temp.	0	75	55	55	57	55	57	55
	–0.5	83	57	57	75	57	75	57
	–1.0	95	75	75	83	75	83	75
	–1.5	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)	92 (Fh) or 118 (Fhmax)
Outdoor air temperature			Less than –1°C	–1°C and above	Less than –1°C	–1°C and above	Less than –1°C	–1°C and above

Operation Details

CS-G120KE

Heating Operation		Compressor Operation Frequency (Hz)						
		Transition Period	Stabilized Period					
Remote Control Setting Temp.		16°C ~ 30°C	16°C ~ 20°C		21°C ~ 25°C		26°C ~ 30°C	
Intake air temperature – Internal setting temperature		Comp Off	Comp Off	Comp Off	Comp Off	Comp Off	Comp Off	Comp Off
Compressor OFF	+1.5	25	25	25	25	25	25	25
	+1.0	25	38	38	43	38	43	38
	+0.5	38	43	43	55	43	55	43
Internal setting temp.	0	82	55	55	64	55	64	55
	–0.5	94	64	64	82	64	82	64
	–1.0	102	82	82	94	82	94	82
	–1.5	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)	98 (Fh) or 118 (Fhmax)
Outdoor air temperature			Less than –1°C	–1°C and above	Less than –1°C	–1°C and above	Less than –1°C	–1°C and above

- Compressor OFF temperature = compressor ON temperature.
- The operation frequency changes every 30 seconds.
- When the difference of the intake air temperature and Internal setting temperature is –1.5°C or more, compressor will operate at Fh continuously for 3 minutes and then change over to Fhmax.
- The compressor stops when the intake air temperature reaches 1.5°C above internal setting temperature and continues for 3 minutes.
- When the compressor stops, it will not start operation for 3 minutes. (Time Delay Safety Control)
- When the intake air temperature decreases to the compressor ON temperature, the compressor starts immediately.
- When the compressor stops, the outdoor fan motor stops 30 seconds later.

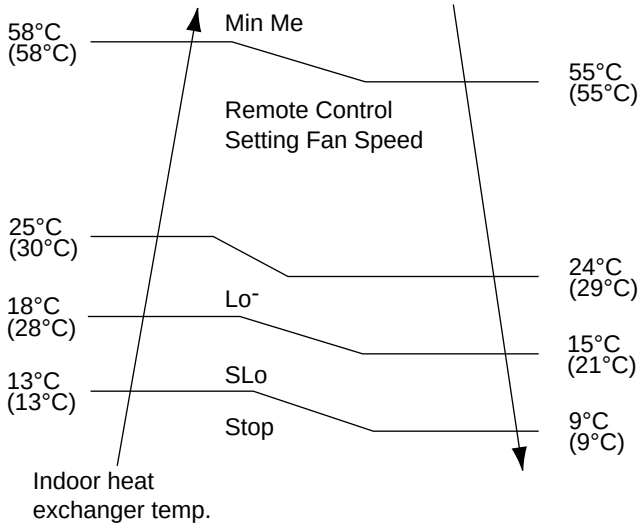
Operation Details

B. Anti Cold Draft Control

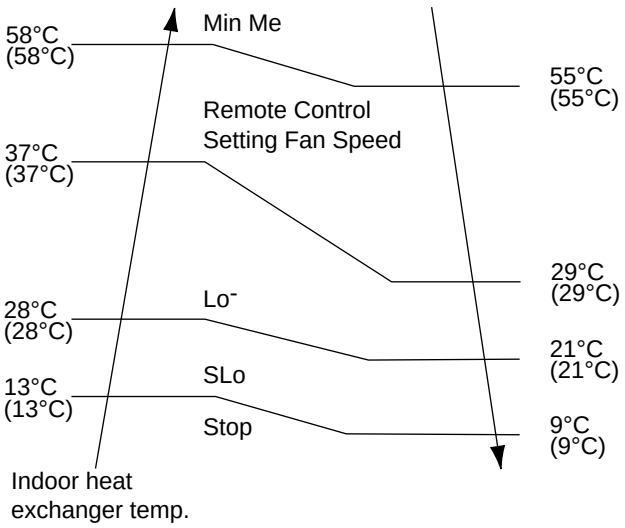
(i) Indoor Fan Control
Indoor fan speed and airflow direction varies in accordance to the indoor heat exchanger temperature as shown below:

a. Manual Fan speed control

(Auto Airflow Direction Control)

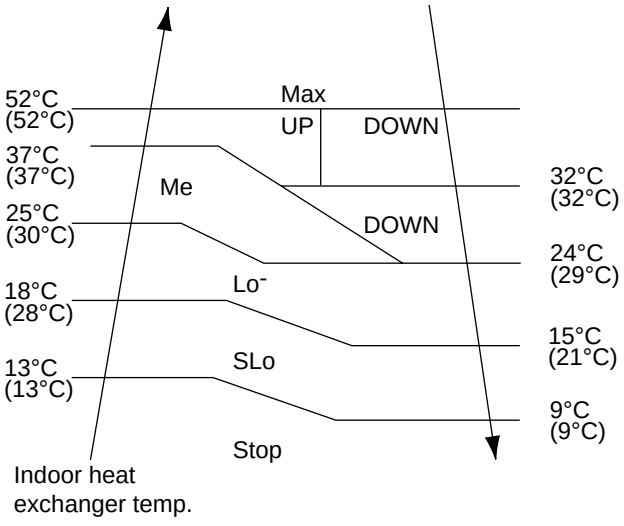


(Manual Airflow Direction Control)

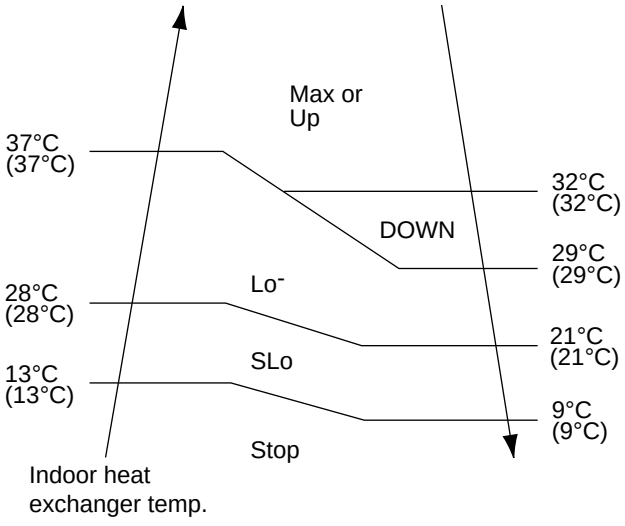


b. Auto Fan Speed Control

(Auto Airflow Direction Control)



(Manual Airflow Direction Control)



Note: – UP means fan speed is increased by 1 rank.
– DOWN means fan speed is decreased by 1 rank.
– Max means fan speed is running at maximum auto fan speed.
– Temperature in ( ) is indicating when powerful mode is selected.

Operation Details

(ii) Hot Start

- At the start of heating operation, the indoor fan stops and compressor operates at Fhmax frequency (118Hz). This is to heat up the indoor heat exchanger in order to avoid cold air discharged.
- Hot Start ends when

  a. Indoor heat exchanger temperature reaches over 15°C

  or

  b. 4 minutes after heating operation starts.
- After Hot Start operation, compressor operates at Fhmax (118Hz) for 2 minutes.

C. Deice Operation

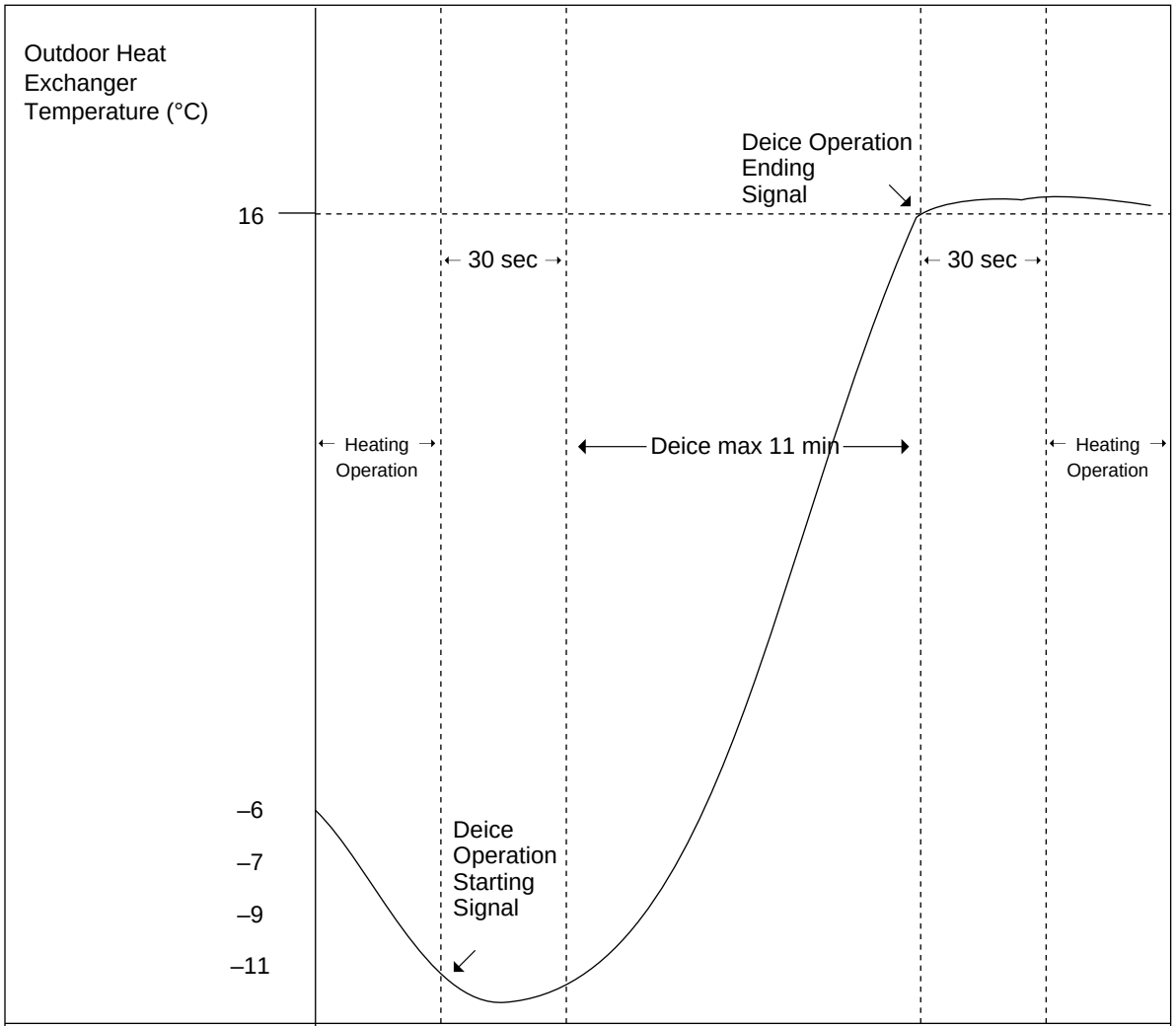
Deice operation occurs when the deice operation starting signal is generated. This happens when one of the following conditions occurs. However, the first deice operation will begin 1 hour after start of heating operation.

	Outdoor Heat Exchanger Temp. Th < 3°C	Outdoor Heat Exchanger Temp. (Th)	Outdoor Temp. (To)
Case 1	120 minutes continuously	Th < -6°C for 3 min continuously	To > –1°C
Case 2	80 minutes continuously	Th < -7°C for 3 min continuously	To > –1°C
Case 3	40 minutes continuously	Th < -9°C for 3 min continuously	To > –1°C
Case 4	40 minutes continuously	Th < -11°C for 3 min continuously	To ≥ –3°C

Note: The above 4 cases are under compressor operating condition.

Operation Details

Deice Operation Time Chart



Compressor operating frequency	Free	55Hz	75Hz (CU-G90KE) 83Hz (CU-G120KE)	OFF	118Hz
Indoor Fan	ON	ON	OFF	OFF	Hot Start
Outdoor Fan	ON	ON	OFF	OFF	ON
4-way valve	ON	ON	OFF	OFF	ON

- Compressor frequency is set at 55Hz when the deice operation starting signal is generated.
- 30 seconds later deice operation starting signal is generated, indoor fan, outdoor fan, 4-way valve are turned off and compressor operates at 55Hz for 30 seconds. (Deice operation starts)
- During deice operation, the compressor operating frequency is set at 75Hz (CU-G90KE) or 83Hz (CU-G120KE).
- Deice will end when the outdoor heat exchanger temperature rises to 16°C or after 11 minutes.

Operation Details

5. FAN OPERATION

This operation is to enable the fan operation without compressor running. Timer operation is valid for fan operation.

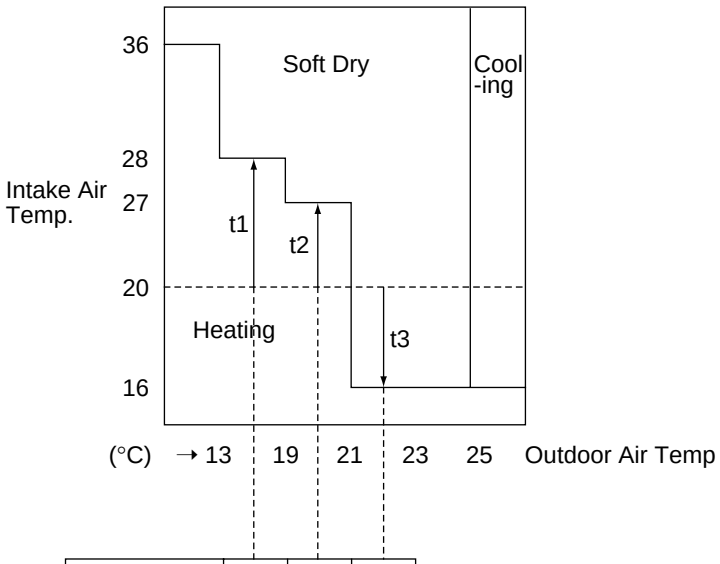
6. AUTOMATIC OPERATION

When the Automatic mode is selected, the operation mode is decided in accordance to remote control setting temperature, intake air temperature and outdoor air temperature.

- During judging the operation mode, indoor fan is running at Lo– speed and outdoor fan at ON in order to sense the indoor intake air temperature and outdoor air temperature for 20 seconds. At this time, Power LED is blinking. After the operation mode is selected, Power LED lights up.

  Refer to the examples below, where the remote control setting temperature is 20°C, 25°C and 30°C.

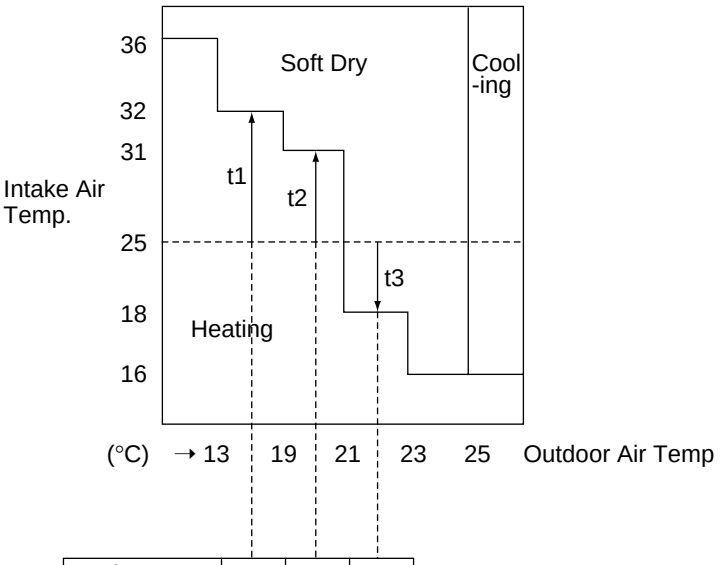
  (a) When the remote control setting temperature is 20°C.



Setting Temp (°C)	t1	t2	t3
18 and below	+10	+8	-5
19 ~ 22	+8	+7	-7
23 ~ 26	+7	+6	-7
27 and above	+6	+5	-8

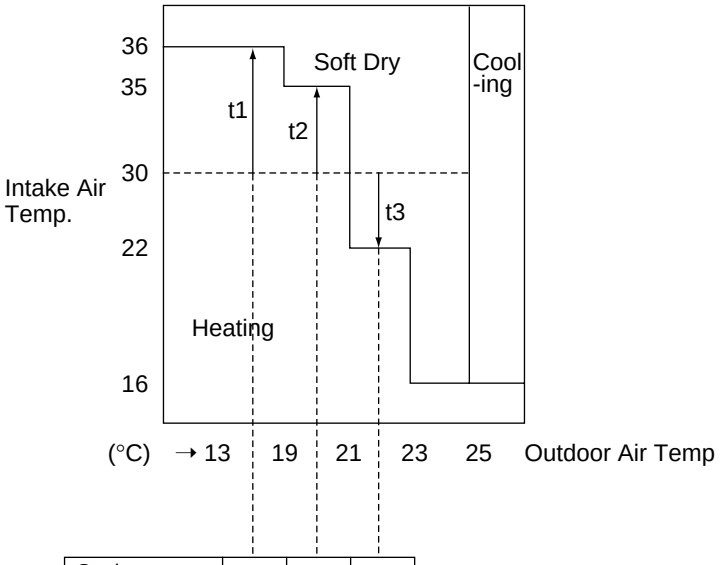
Operation Details

(b) When the remote control setting temperature is 25°C.



Setting Temp (°C)	t1	t2	t3
18 and below	+10	+8	-5
19 ~ 22	+8	+7	-7
23 ~ 26	+7	+6	-7
27 and above	+6	+5	-8

(c) When the remote control setting temperature is 30°C.



Setting Temp (°C)	t1	t2	t3
18 and below	+10	+8	-5
19 ~ 22	+8	+7	-7
23 ~ 26	+7	+6	-7
27 and above	+6	+5	-8

Operation Details

- When the operation mode is changed over, the value for t1, t2 and t3 are shifted as follows:
  Cooling/Soft dry → Heating : –2°C
  Heating → Cooling/Soft dry : +2°C
- When the indoor intake air temperature is lower than 16°C, heating operation is immediately started.
- When the outdoor air temperature is more than 25°C, and the intake air temperature is over 16°C, cooling operation is immediately started.
- The operation mode is judged every 30 minutes.
- When the operation mode (Heating, Cooling or Soft Dry) is decided, the internal setting temperature will shift as shown below:

Remote Control Setting temperature

+

Outdoor temperature shift

+

Fan speed shift

+

Automatic mode shift

+

Cooling	+0.75°C
Soft Dry	0°C
Heating	–0.75°C

↓

INTERNAL SETTING TEMPERATURE

MEMO

7. INDOOR FAN SPEED CONTROL

CS-G90KE

Fan Speed No.	Voltage Supply to Fan Motor DC (V)	Cooling		Soft Dry	Remarks	Heating		Remarks
		Manual	Auto			Manual	Auto	
0		OFF	OFF	OFF		OFF	OFF	• Hot Start Control
1								
2	12.1			SLo	• Deodorizing control • Sleep Mode			• SLo: Hot Start Control
3	15.3		Lo–		• Auto operation mode judgement • Quiet operation			• Lo–: Hot Start Control Sleep Mode Thermo OFF Anti Cold Draft Control
4	15.8							
5	16.4							
6	17.1				• Sensible Heat Control			
7	17.7	Lo			• Sensible Heat Control • On Timer preparatory operation + Auto Fan	Lo	Auto Fan (Min.)	• On Timer preparatory operation + Auto Fan
8	17.7							
9	17.8							
10	17.8	Me–			• Sensible Heat Control • Sensible Heat Control + Auto Fan	Me–		
11	18.3		Auto Fan					• Auto Fan + Powerful
12	18.9				• Sensible Heat Control + Fan Auto			
13	19.0		Auto Fan		• Sensible Heat Control • Auto Fan + Powerful	Me		• Manual Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful • Temporary Operation
14	19.4	Me			• Manual Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful • Sensible Heat Control + Auto Fan • Temporary Operation			
15	20.1		Auto Fan		• Auto Fan + Powerful		Auto Fan (Max.)	
16	20.8				• Sensible Heat Control			
17	21.3				• Auto Fan + Powerful			
18	21.4					Me+		
19	21.8	Me+			• Manual Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful			
20	22.3							
21	22.8							
22	23.3							
23	23.4	Hi			• Manual Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful • Test Run			
24	23.9							
25	24.1							
26	24.4							
27	24.7							• Auto Fan + Powerful
28	25.1				• SHi: Maximum Capacity Operation			
29	26.2							
30	27.9					SHi		• Manual Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful • Test Run
31	32.1							• SSHi: Maximum Capacity Operation

Operation Details

CS-G120KE

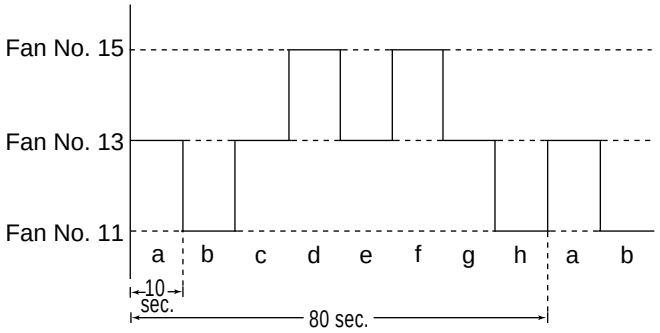
Fan Speed No.	Voltage Supply to Fan Motor DC (V)	Cooling		Soft Dry	Remarks	Heating		Remarks
		Manual	Auto			Manual	Auto	
0		OFF	OFF	OFF		OFF	OFF	• Hot Start Control
1								
2	20.4			SLo	• Deodorizing control • Sleep Mode			• SLo: Hot Start Control
3	21.7		Lo–		• Auto operation mode judgement • Quiet operation			• Lo–: Hot Start Control Sleep Mode Thermo OFF Anti Cold Draft Control
4	22.0							
5	22.2							
6	22.5				• Sensible Heat Control			
7	22.7	Lo			• Sensible Heat Control • On Timer preparatory operation + Auto Fan	Lo	Auto Fan (Min.)	• On Timer preparatory operation + Auto Fan
8	22.7					Me–		
9	22.7							
10	23.2	Me–			• Sensible Heat Control • Sensible Heat Control + Auto Fan			
11	23.5		Auto Fan					• Auto Fan + Powerful
12	24.1				• Sensible Heat Control + Auto Fan			
13	24.3		Auto Fan		• Sensible Heat Control • Auto Fan + Powerful	Me		• Manual Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful • Temporary Operation
14	24.6	Me			• Manual Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful • Sensible Heat Control + Auto Fan • Temporary Operation			
15	24.9		Auto Fan		• Auto Fan + Powerful		Auto Fan (Max.)	
16	25.4				• Sensible Heat Control			
17	26.0				• Auto Fan + Powerful			
18	26.5					Me+		
19	27.1	Me+			• Manual Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful			
20	27.4							
21	28.0							
22	28.4							
23	28.8							
24	29.4							
25	29.7							
26	30.0	Hi			• Manual Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful • Test Run			
27	30.9							• Auto Fan + Powerful
28	31.5				• SHi: Maximum Capacity Operation			
29	32.1							
30	32.6					SHi		• Manual Fan + Powerful • On Timer preparatory operation + Manual Fan + Powerful • Test Run
31	36.0							• SSHi: Maximum Capacity Operation

Operation Details

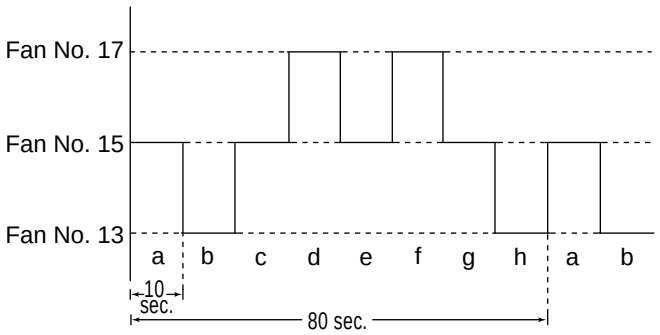
(a) Cooling Automatic Fan Speed

The Automatic Fan Speed for cooling operation is shown as below:

(i) When Automatic Fan Speed is selected



(ii) When Automatic Fan Speed and Powerful Mode are selected



Note: The Fan Speed will change every 10 seconds and it will be repeated from a to h every 80 seconds.

(b) Heating Automatic Fan Speed

The Automatic Fan Speed for heating operation is shown below:

- When Automatic Fan Speed is selected, the Fan Speed will change every 10 seconds from Fan Speed No. 7 to No. 15 depending on indoor heat exchanger temperature. Each time the Fan Speed will move 1 rank up or down.
- When Automatic Fan Speed and Powerful Mode are selected, the Fan Speed will change for every 10 seconds from Fan Speed No. 11 to No. 27 depend on heat exchanger temperature. Each time the Fan Speed will move 1 rank up or down.

Operation Details

(c) Cooling Operation at SHi Speed

During Cooling operation, Indoor Fan speed is set at SHi when the following conditions occur:

- Outside air temperature is 30°C or above
- Compressor operates at 72Hz (CU-G90KE) or 78Hz (CU-G120KE) and above
- Remote control setting fan speed is High
- Indoor intake air temperature is 24°C or above
- Remote control setting temperature is 16°C
- Within 30 minutes after start of operation.

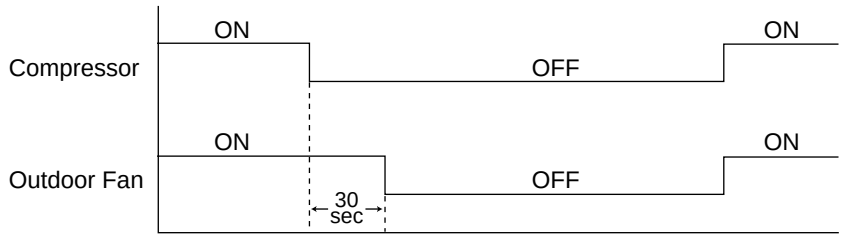
(d) Heating Operation at SSHi Speed

During Heating operation, Indoor Fan speed is set at SSHi when the following conditions occur:

- Heating operation for 2 hours or more
- When remote control setting fan speed is High
- Indoor intake air temperature is 17°C or above and less than 23°C
- Outdoor air temperature is 4°C or below
- Remote control setting temperature is 30°C
- Compressor operates at 92Hz (CU-G90KE) or 98Hz (CU-G120KE) and above
- Airflow Direction is set at Manual.

8. OUTDOOR FAN CONTROL

- Outdoor fan motor is controlled with 1 speed only. Fan is in operation when the compressor starts operation and stops 30 seconds after compressor stops operation.



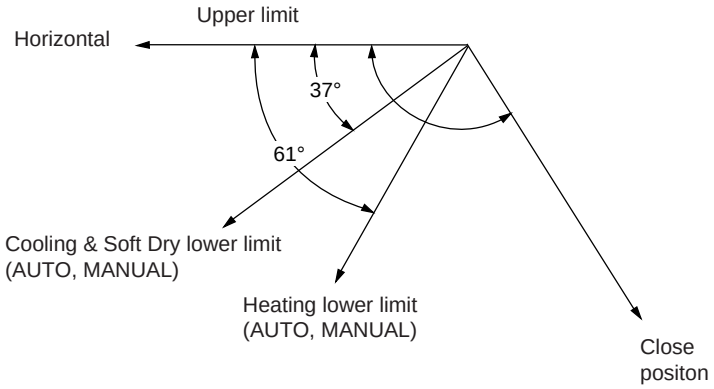
Operation Details

9. AIRFLOW DIRECTION

- Blade angle setting (Upper limit reference)

Operation				Blade angle				
				1	2	3	4	5
Heating	Airflow direction auto	Indoor heat exchanger temperature	A	14°				
			B	61°				
			C	0°				
	Airflow direction manual	–	–	0°	18°	29.4°	45.1°	61°
Cooling	Airflow direction auto	–		0° ~ 37°				
		Anti-dew formation control		3° ~ 37°				
	Airflow direction manual	–		0°	8°	18°	28°	37°
		Anti-dew formation control		3°	11.5°	20°	28.5°	37°
Dry	Airflow direction auto	–		0° ~ 37°				
		Anti-dew formation control		3° ~ 37°				
	Airflow direction manual	–		0°	8°	18°	28°	37°
		Anti-dew formation control		3°	11.5°	20°	28.5°	37°
Stop				138°				

- Setting angle



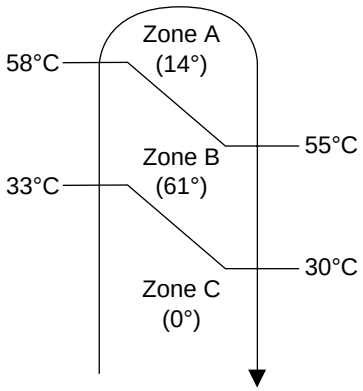
(a) Airflow Direction Manual

By pressing the remote control airflow direction setting switch, the blade will move to the indicated angle (1, 2, 3, 4, 5) as shown in the table. When the remote control OFF/ON switch is pressed, the blade will move to the Close position.

Operation Details

(b) Airflow Direction Auto

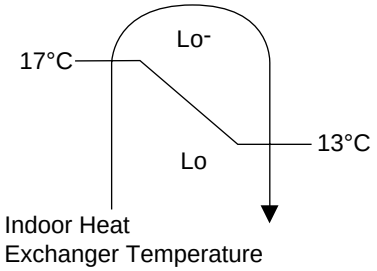
By setting the airflow direction to AUTO, the blade swings up and down from 0°-37° during Cooling and Soft Dry operation. During Heating operation, the blade angle will shift according to the indoor heat exchanger temperature as shown below:



10. QUIET OPERATION

The purpose of this control is to reduce indoor operating noise. Indoor fan speed is set to Lo- when the following conditions occur.

- Indoor fan speed is set at Low
- Indoor heat exchanger temperature rises to 17°C or above
- Compressor operates for 5 minutes or above
- Operation frequency is less than 40Hz (CU-G90KE) or 43Hz (CU-G120KE)



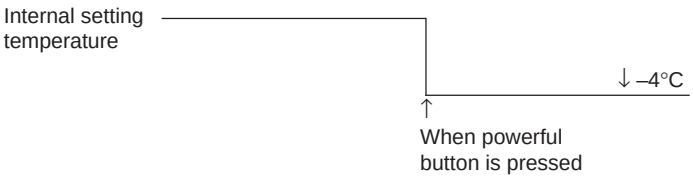
When the indoor heat exchanger temperature is decreased to 13°C or below, the control is cancelled and the indoor fan speed will resume from Lo- to Low.

Operation Details

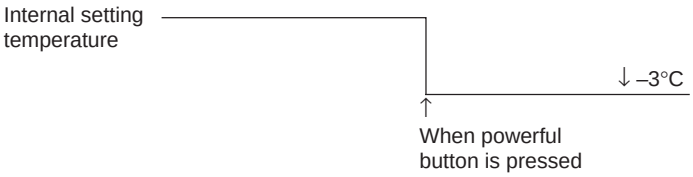
11. POWERFUL MODE OPERATION

When the powerful mode is selected, the internal setting temperature will shift to achieve the setting temperature quickly.

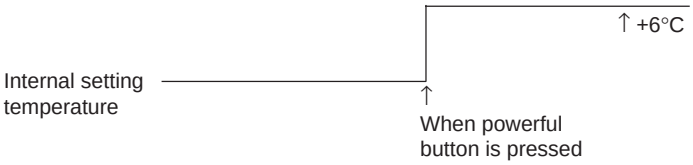
(a) Cooling Operation



(b) Soft Dry Operation



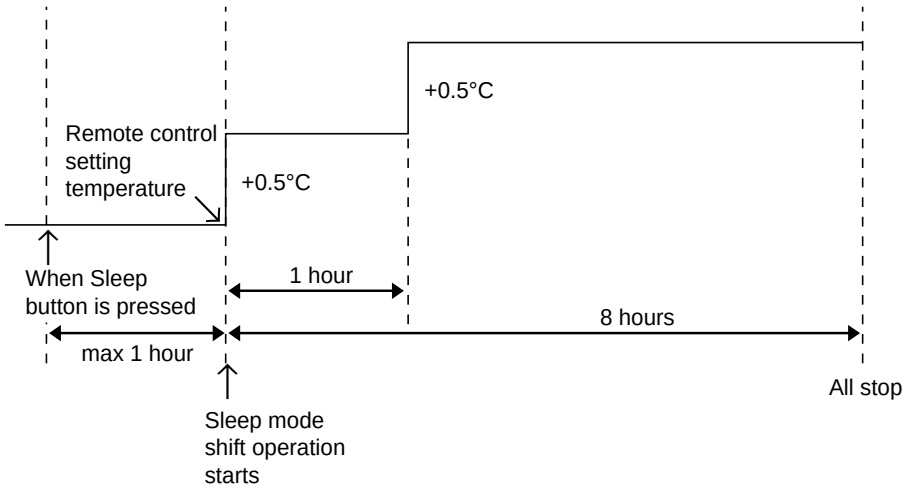
(c) Heating Operation



12. SLEEP MODE OPERATION

(a) Cooling Operation / Soft Dry Operation

- When the sleep button is pressed, the remote control setting temperature will increase 0.5°C after 1 hour or when the remote control setting temperature is reached. After another hour, 0.5°C will be increased again.

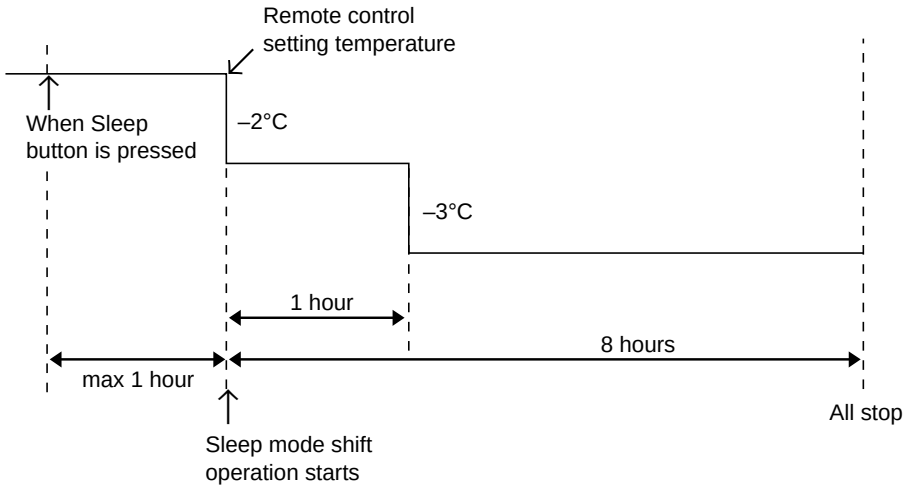


※ • During sleep shift operation, indoor fan speed operates at SLo.

Operation Details

(b) Heating Operation

- When the sleep button is pressed, the remote control setting temperature will decrease 2°C after 1 hour or when the remote control setting temperature is reached. After another hour, 3°C will be decreased again.

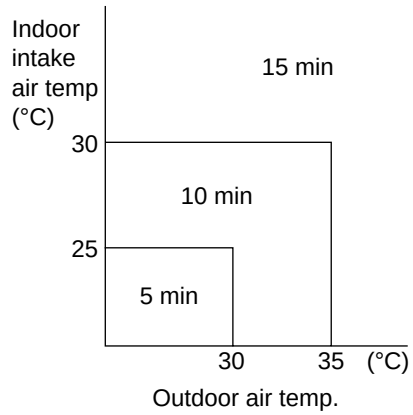


※ • During sleep shift operation, indoor fan speed operates at Lo⁻.

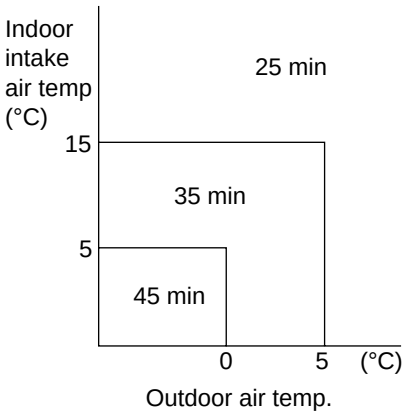
13. DELAY ON TIMER CONTROL

- When the Delay On Timer is set by using remote control, the unit will start to operate slightly earlier before the set time, so that the room will nearly reach the set temperature by the On Timer set time.
- 60 minutes before the set time, the indoor fan operates at SLo and outdoor fan operates for 20 seconds to sample the indoor intake air temperature and outdoor air temperature in order to determine the starting time for preparatory operation. (The Power LED blinks during sampling.)
- The time of the preparatory operation will start before the On Timer set time.

a. Cooling/Soft Dry



b. Heating

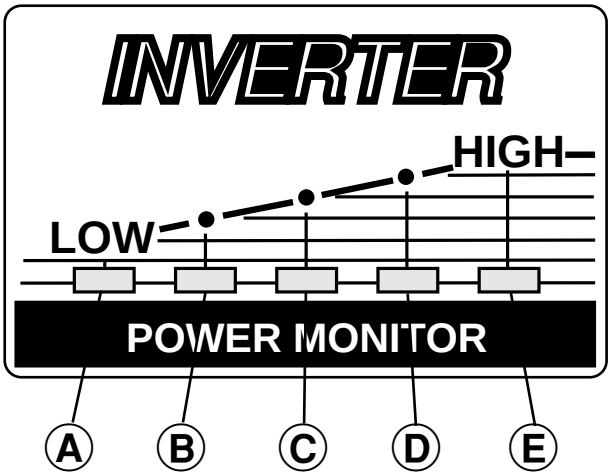


14. AUTO RESTART CONTROL

- If there is a power failure, operation will automatically be restarted when the power is resumed. It will start with the previous operation mode and airflow direction. (Time Delay Safety Control is valid)
- Auto Restart Control is not available when Timer or Sleep Mode is set.

Operation Details

15. POWER MONITOR DISPLAY



Power Monitor LED lights on when the compressor is in operation. The number of the LED lights on is in accordance to the compressor operating frequency.

Display	A	A, B	A, B, C	A, B, C, D	A, B, C, D, E
Cooling & Soft Dry Indication Frequency (Hz)	25 ~ 40	41 ~ 50	51 ~ 60	61 ~ 70	71 ~ 83 (CS-G90KE) 71 ~ 94 (CS-G120KE)
Heating Indication Frequency (Hz)	25 ~ 40	41 ~ 60	61 ~ 75	76 ~ 90	91 ~ 118

16. REMOTE CONTROL SIGNAL RECEIVING SOUND ON/OFF

- Press the AUTO button for 10 seconds or longer to switch off the signal receiving sound.
- Press the AUTO button for 10 seconds or longer again to switch on the signal receiving sound.

17. INDOOR POWER RELAY CONTROL

- The power relay turns on when one of the indoor LED lights on.
- The power relay turns off when all of the indoor LEDs lights off.
- When the air conditioner is stopped during operation, the power relay stays ON for 3 minutes.
- The power relay will turn off if a sudden power failure occurs for 0.5 second and below. The power relay will turn on again after 3 minutes. It will start with the previous operation condition before the power failure.

Operation Details

B. PROTECTION

1. PROTECTION CONTROL FOR ALL OPERATIONS

a. Time Delay Safety Control

- The compressor is not restarted for 3 minutes after stop of compressor.

b. 30 Second Forced Operation

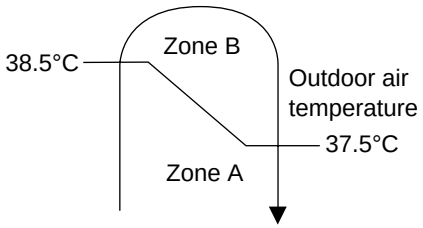
- Once the compressor is ON, it will not turn OFF for 30 seconds. However, it is turned off by remote control or Automatic switch.

c. Total Running Current Control

- When the outdoor unit total running current (AC) exceeds I1, the frequency is lowered by 1 rank. If I1 is not exceeded for 30 seconds, the frequency is highered by 1 rank at one time. If the outdoor unit total running current exceeds I2, the compressor is immediately stopped for 3 minutes.

<Cooling, Soft Dry set value>

	Zone A		Zone B	
Model No.	CU-G90KE	CU-G120KE	CU-G90KE	CU-G120KE
I1(A)	5.4	7.2	5.1	6.2
I2(A)	7.3	10.8	7.3	10.8



Note: Zone A will be used 30 minutes after operation starts.

<Heating set value>

Model No.	CU-G90KE	CU-G120KE
I1(A)	6.2	9.2
I2(A)	7.3	10.8

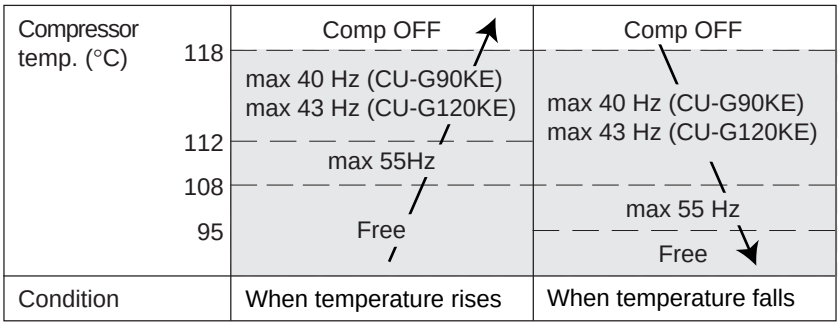
Operation Details

d. Power Transistor Overheating Prevention Control

- When the power transistor temperature rises to 110°C, the OLP goes into operation and compressor stops immediately. The compressor is restarted when the power transistor temperature decreases to 95°C after 3 minutes (Time Delay Safety Control).

e. Compressor Overheating Prevention Control

- When the temperature of compressor rises to 108°C, the frequency is reduced as shown in diagram below. When the temperature rises to 118°C or above, the compressor stops. The compressor will start operating at low frequency when the temperature falls to 118°C and resume to normal condition when the temperature falls to 95°C.



f. Low Pressure Control (Gas Leakage Detection)

- When the following conditions as shown in the below table occur, the compressor stops and restarts after 3 minutes. If this phenomenon is continuously occuring twice within 20 minutes, the air conditioner will stop operation and the Timer LED blinks. At this time, [F91] is displayed on the indoor unit.

Comp. Frequency ※	72 Hz	92 Hz	78 Hz	98 Hz
Total Running Current ※	≥ 1.88 A and < 2.1 A	≥ 1.88 A and < 2.3 A	≥ 1.88 A and < 3.0 A	≥ 1.88 A and < 3.6 A
Indoor Heat Exchanger Temp.	15°C or above	30°C or below	15°C or above	30°C or below
Operation	Cooling/Soft Dry	Heating	Cooling/Soft Dry	Heating
Model No.	CU-G90KE		CU-G120KE	

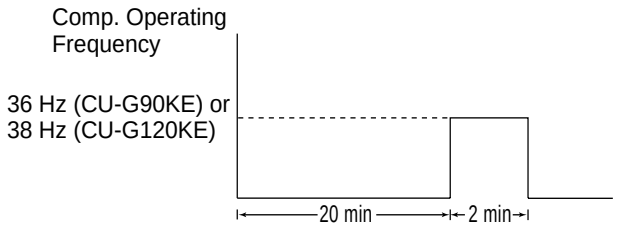
Note: The above conditions are not valid during Deice operation.

※ This conditions are continuous for 5 minutes.

Operation Details

g. Minimum Frequency Operation Protection

- When the compressor operates at less than 36 Hz (CU-G90KE) or 38 Hz (CU-G120KE) for 20 minutes, the operating frequency will increase to 36 Hz (CU-G90KE) or 38 Hz (CU-G120KE) for 2 minutes.



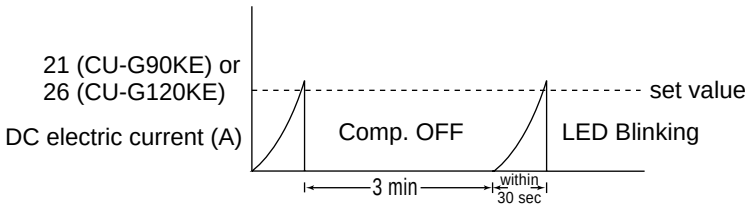
h. Low Frequency Operation Protection

- When the following conditions occur, the compressor will operate at minimum 40 Hz (CU-G90KE) or 43 Hz (CU-G120KE).

Indoor intake air temp. (°C)	≥ 30°C or < 15°C	≥ 16°C or < 16°C
Outdoor air temp. (°C)	≥ 38°C or < 16°C	≥ 24°C or < 4°C
Indoor heat exchanger temp. (°C)	< 30°C	≥ 0°C
Operation	Cooling/ Soft Dry	Heating

i. DC Peak Current Control

- When the electric current to the power transistor exceeds the set value, DC 21 ± 3A (CU-G90KE) or DC 26 ± 3A (CU-G120KE), the compressor stops. The compressor restarts after 3 minutes.
- If within 30 seconds the set value exceeds again after start of the compressor, all indoor and outdoor relays will be turned off and all the LEDs will blink.



j. DC Reset

- When the voltage supply (DC) to power transistor is below the set value i.e, 178 ± 5 V, the compressor is stopped. The compressor will restart after 3 minutes.
- If within 30 seconds the voltage supply (DC) is below the set value again after start of the compressor, all indoor and outdoor relays will be turned off and all the LEDs will blink.

k. High Power Supply Voltage Protection

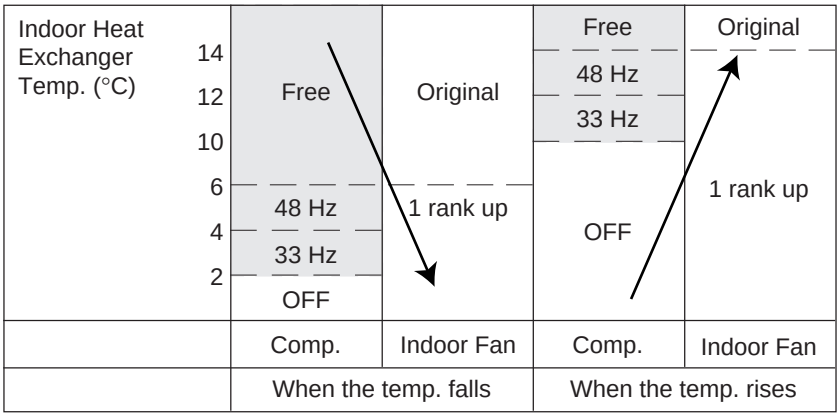
- When the voltage supply (AC) exceeds 295 ± 15 V (T_0), the air conditioner stops and restarts automatically when the voltage supply (AC) is below (T_0 - 5)V. However, waiting for 3 minutes is necessary for re-operation.

Operation Details

2. PROTECTION CONTROL FOR COOLING & SOFT DRY

a. Anti-Freezing Control

- When the temperature of the indoor heat exchanger becomes low, the compressor operating frequency is reduced and stopped when the temperature falls to lower than 2°C continuously for 6 minutes. This is to prevent freezing of indoor heat exchanger. When the temperature rises to 10°C or above, the compressor restarts with 3 minutes. The compressor operating frequency will resume to normal when the temperature reaches 14°C.
- Indoor fan speed will increase when the temperature falls and it will resume to original speed when the temperature increases to 14°C for 5 minutes continuously.



Note: The above phenomenon occurs when the fan is running at Me+ or below.

b. Anti-Dew Formation Control

- When the following conditions occur for 20 minutes continuously, anti-dew formation is controlled:
  1. Indoor intake air temperature is 24°C or above.
  2. Outdoor air temperature is less than 30°C.
  3. Remote control setting temperature is less than 25°C.
- During anti-dew formation control, compressor operates at 55 Hz and vertical airflow direction blade moves down slightly (as shown in Airflow Direction Control). Indoor fan speed increases by 1 rank if it is set at Low or below or decreases by 2 ranks if it is set at Hi speed.
- This control is cancelled immediately when either condition 1–3 as written above is changed, or remote control setting temperature or fan speed is changed.

Operation Details

c. Anti-Fog Discharge Control

- The compressor operating frequency is regulated by outdoor air temperature and operation time to prevent fog discharged from indoor unit as shown in the table below.

		Compressor operating frequency (Hz)			
Operation Time, T (min)	0 ≤ T < 30	72	83	78	94
	30 ≤ T < 90	68	72	70	78
	90 ≤ T < 180	57	68	64	70
	T ≥ 180	55	57	55	64
Outdoor air temperature (°C)		less than 24°C	24°C and above	less than 24°C	24°C and above
Model No.		CU-G90KE		CU-G120KE	

Note: • Indoor fan is running at Me+ or below.
• After 420 minutes from the start of operation, the operation timer counting is restarted from “0”.

d. High Pressure Control at Minimum Frequency Control

- When the outdoor air temperature increases to 38.6°C, compressor operating frequency reduces to minimum of 33 Hz. Compressor operating frequency will resume to normal when outdoor air temperature decreases to 37.8°C.

e. Electrical Components Overheating Protection

- When outdoor air temperature is 38.5°C or above and the compressor operating frequency is 25 Hz or above, total running current set value is reduced (refer to Total Running Current Control) and the operating frequency is reduced.
- The protection control is cancelled when the outdoor air temperature decreases to 37.5°C or compressor stops.

Operation Details

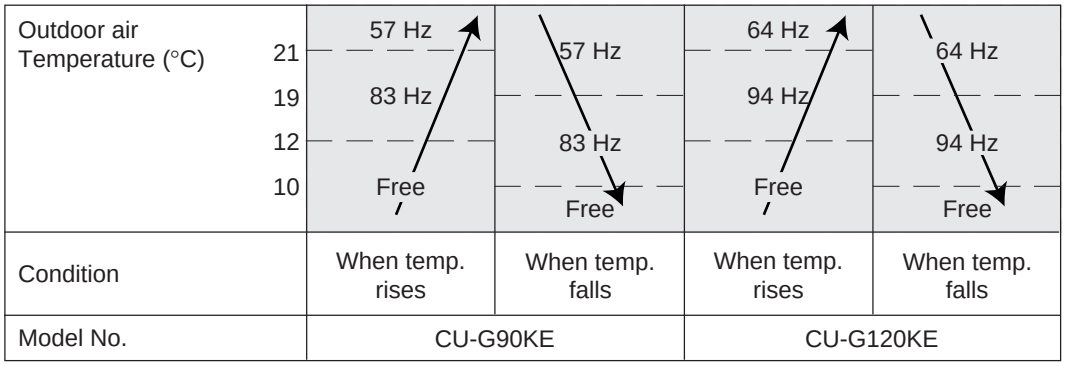
3. PROTECTION CONTROL FOR HEATING OPERATION

a. Intake Air Temperature Control

- When the intake air temperature is 10°C or above and remote control setting fan speed is less than Medium, the compressor operates at 92 Hz (CU-G90KE) or 98 Hz (CU-G120KE).

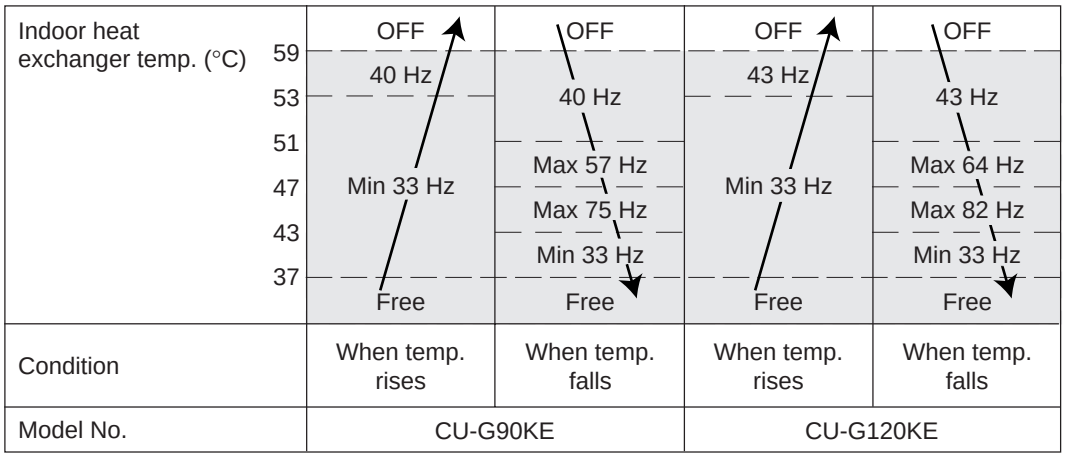
b. Outdoor Air Temperature Control

- The compressor operating frequency is regulated in accordance to the outdoor air temperature as shown in the diagram below. This control will begin 50 seconds after the compressor starts.



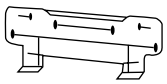
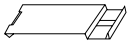
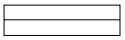
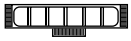
c. High Pressure Control

- The compressor operating frequency is regulated in accordance to the indoor heat exchanger temperature.



Installation Information

Attached accessories

No.	Accessories part	Qty.	No.	Accessories part	Qty.
1	Installation plate 	1	6	Drain elbow	1
2	Installation plate fixing screw	6	7	Clamping cover of piping 	1
3	Remote control	1	8	Vinyl tape	3
4	Battery	2	9	Vinyl tape 	1
5	Air purifying filter 	2			

Accessories: Flaring piping kit
CZ-3F5, 7AEN (CS-G90KE)
CZ-4F5, 7AEN (CS-G120KE)

SELECT THE BEST LOCATION

INDOOR UNIT

- There should not be any heat source or steam near the unit.
- There should not be any obstacles blocking the air circulation.
- A place where air circulation in the room is good.
- A place where drainage can be easily done.
- A place where noise prevention is taken into consideration.
- Do not install the unit near the door way.
- Ensure the spaces indicated by arrows from the wall, ceiling, fence or other obstacles.
- Indoor unit of this room air conditioner shall be installed on the wall in a height of at least 2.3 m.

OUTDOOR UNIT

- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.
- If piping length is over the rated length, additional refrigerant should be added as shown in the table.

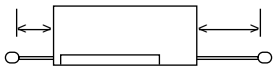
MODEL	Piping size		Rated Length	Max. Elevation (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)
	Gas	Liquid				
G90KE	3/8"	1/4"	5	5	7	–
G120KE	1/2"	1/4"	5	5	7	–

Installation Information

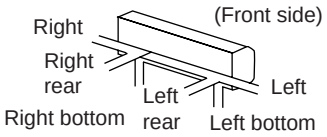
Indoor / Outdoor unit installation diagram

Length of power supply cord

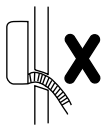
about 1.1 m about 1.8 m



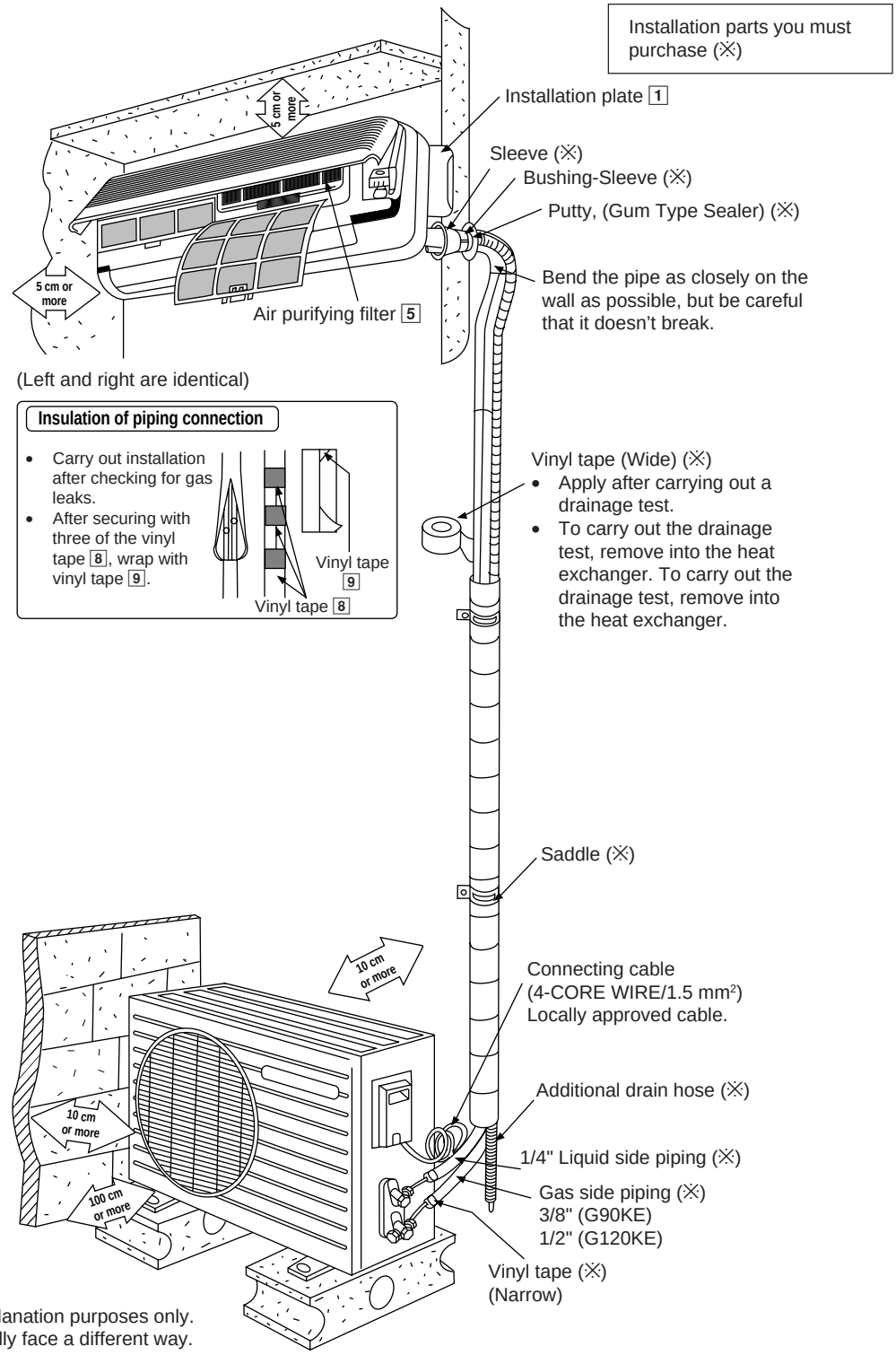
Piping direction



Attention not to bend up drain hose



Installation parts you must purchase (※)


5 cm or more
5 cm or more
Installation plate 1
Sleeve (※)
Bushing-Sleeve (※)
Putty, (Gum Type Sealer) (※)
Bend the pipe as closely on the wall as possible, but be careful that it doesn't break.
Air purifying filter 5
(Left and right are identical)
Insulation of piping connection
• Carry out installation after checking for gas leaks.
• After securing with three of the vinyl tape 8, wrap with vinyl tape 9.
Vinyl tape 9
Vinyl tape 8
Vinyl tape (Wide) (※)
• Apply after carrying out a drainage test.
• To carry out the drainage test, remove into the heat exchanger. To carry out the drainage test, remove into the heat exchanger.
Saddle (※)
10 cm or more
10 cm or more
100 cm or more
Connecting cable
(4-CORE WIRE/1.5 mm²)
Locally approved cable.
Additional drain hose (※)
1/4" Liquid side piping (※)
Gas side piping (※)
3/8" (G90KE)
1/2" (G120KE)
Vinyl tape (※)
(Narrow)

- This illustration is for explanation purposes only. The indoor unit will actually face a different way.

Servicing Information

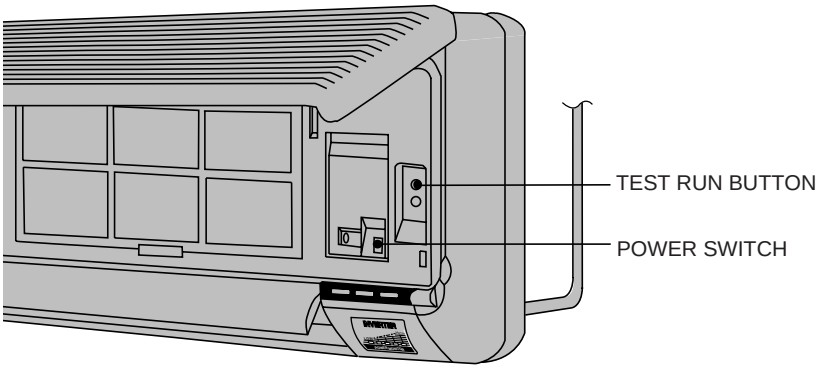
A. TROUBLESHOOTING

1. RATED FREQUENCY OPERATION

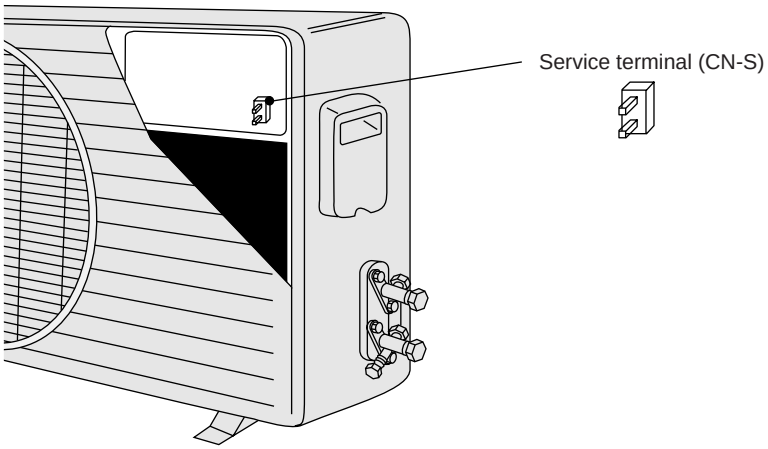
During troubleshooting and servicing, rated compressor operating frequency must be obtained in order to check the specification and technical data. Below are the methods used to obtain rated compressor operating specification.

(a) Cooling

(i) Press the Test Run button on the indoor unit. The air conditioner starts operation at Cooling rated frequency.



(ii) Short the service terminal (CN-S) of the outdoor printed circuit board. The air conditioner starts operation at Cooling rated frequency.



(b) Heating

Keep pressing the Test Run button, switch off and on the Power Switch, then release the Test Run button. The air conditioner starts operation at Heating rated frequency.

Servicing Information

2. TROUBLESHOOTING AIR CONDITIONER

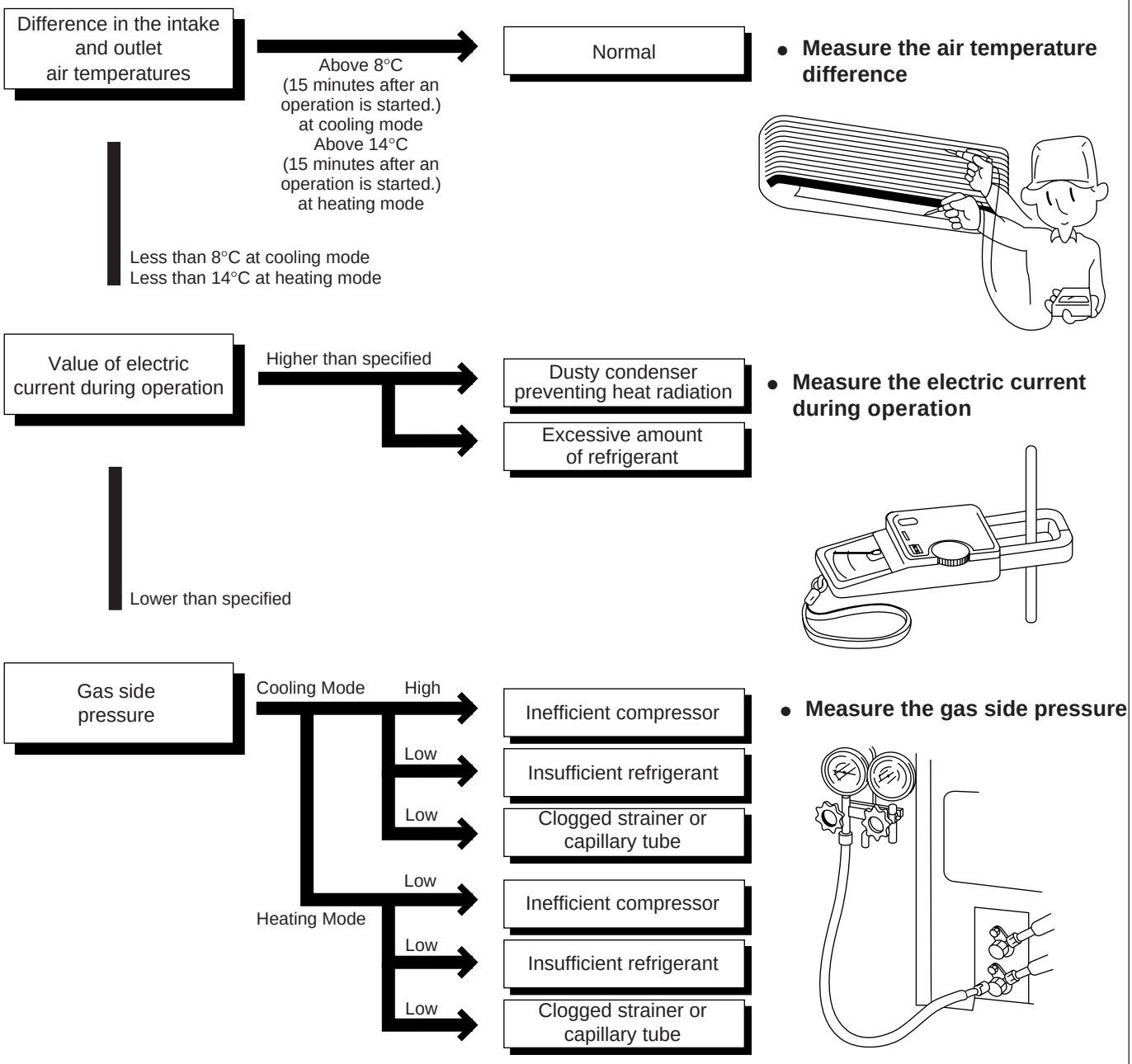
Refrigeration cycle system

In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor or a fan.
The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions; the standard values for them are shown in the table on the right.

Normal Pressure and Outlet Air Temperature (Standard)

	Gas pressure MPa (kg/cm²G)	Outlet air temperature (°C)
Cooling mode	0.4 ~ 0.6 (4 ~ 6)	12 ~ 16
Heating Mode	1.5 ~ 2.1 (15 ~ 21)	36 ~ 45

★ Condition:
- Indoor fan speed; High.
- Outdoor temperature is 35°C at cooling mode and 7°C at heating mode.
- Compressor operates at rated frequency.



- **Measure the air temperature difference**

- **Measure the electric current during operation**

- **Measure the gas side pressure**

Servicing Information

1. Relationship between the condition of the air conditioner and pressure and electric current

Condition of the air conditioner	Cooling Mode			Heating Mode		
	Low Pressure	High Pressure	Electric current during operation	Low Pressure	High Pressure	Electric current during operation
Insufficient refrigerant (gas leakage)	↘	↘	↘	↘	↘	↘
Clogged capillary tube or Strainer	↘	↘	↘	↗	↗	↗
Short circuit in the indoor unit	↘	↘	↘	↗	↗	↗
Heat radiation deficiency of the outdoor unit	↗	↗	↗	↘	↘	↘
Inefficient compression	↗	↘	↘	↗	↘	↘

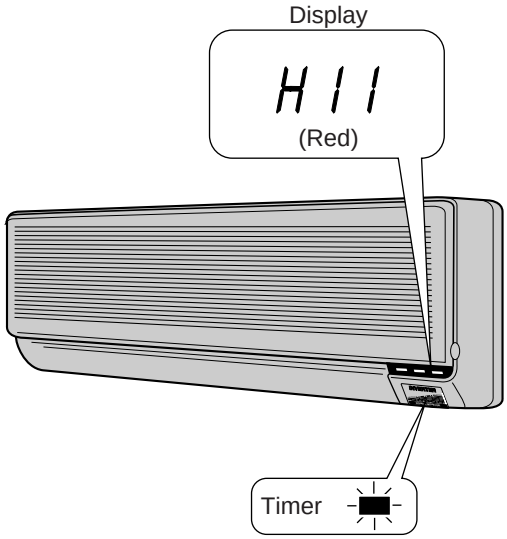
- Carry out the measurements of pressure, electric current, and temperature fifteen minutes after an operation is started.

Servicing Information

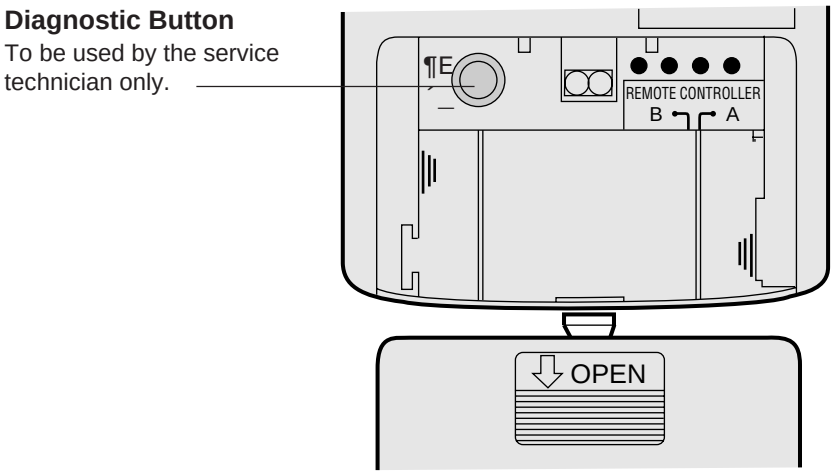
B. SELF DIAGNOSIS DISPLAY

The diagnostic display can be seen on the receiver of the Front Grille.

- When an abnormality occurs, the unit automatically stops, and the TIMER LED blinks to indicate a malfunction. At the same time, the type of abnormality will be indicated on the receiver as shown in the diagram below. Providing this information reduces the time spent in diagnosing procedures.



- The diagnostic display vanishes when the power is turned off.
- When power is re-supplied and the Diagnostic Button on the Remote Control is pressed, the type of the previous abnormality and the protection control works will be displayed on the receiver for approximately 10 seconds.



- By starting cooling operation using TEST RUN button and press the Diagnostic Button at the remote control, the previous abnormalities are deleted.
- Depending on the type of abnormality, you may be able to override the abnormality and use temporary operation (for abnormalities indicated by ○ mark in the table below).
  Use the remote control to select cooling or heating operation mode and press OFF/ON button. At this moment, four short beeps “bip.bip.bip.bip” will sound and TIMER LED will blink.

Servicing Information

Diagnosis display	Abnormality / Protection control	Abnormality Judgement	Temporary operation	Primary location to verify
H11	Indoor / outdoor abnormal communication	1 min after starting operation	–	• Internal / external cable connections • Indoor / Outdoor PCB
H14	Indoor intake air temperature sensor abnormality		–	• Intake air temperature sensor (defective or disconnected)
H15	Outdoor compressor temperature sensor abnormality		–	• Compressor temperature sensor (defective or disconnected)
H16	Outdoor Current Transformer open circuit		–	• Outdoor PCB • Power transistor module
H19	Indoor fan motor mechanism lock		–	• Indoor PCB • Fan motor
H23	Indoor heat exchanger temperature sensor abnormality		○ (Cooling only)	• Heat exchanger temperature sensor (defective or disconnected)
H27	Outdoor air temperature sensor abnormality		○	• Outdoor temperature sensor (defective or disconnected)
H28	Outdoor heat exchanger temperature sensor abnormality		○	• Outdoor heat exchanger temperature sensor (defective or disconnected)
H98	Indoor high pressure protection		–	• Air filter dirty • Air circulation short circuit
H99	Indoor heat exchanger anti-freezing protection		–	• Insufficient refrigerant • Air filter dirty
F11	Cooling / Heating cycle changeover abnormality	4 times occurance within 40 minutes	–	• 4-way valve • V-coil
F91	Refrigeration cycle abnormality	2 times occurance within 30 minutes	–	• No refrigerant (3-way valve is closed)
F96	Outdoor power transistor module overheating protection	4 times occurance within 30 minutes	–	• Excess refrigerant • Improper heat radiation • Power transistor
F97	Outdoor compressor overheating protection	4 times occurance within 20 minutes	–	• Insufficient refrigerant • Compressor
F98	Total running current protection	3 times occurance within 30 minutes	–	• Excess refrigerant • Improper heat radiation
F99	Outdoor Direct Current (DC) peak detection	2 times occurance continuously	–	• Outdoor PCB • Power transistor • Compressor

Servicing Information

(a) Current Transformer Defective

When the Current Transformer (CT) is an open circuit, total running current is less than 1.88 A and the indicated frequency is 72 Hz (CU-G90KE) or 78 Hz (CU-G120KE) or above. After 3 minutes of operation, the abnormality signal is sent from outdoor to indoor and [H16] is displayed.

(b) 4 Way Valve Defective

i. Heating Operation (except Deice)

After 4 minutes of operation, the indoor heat exchanger temperature is lower than 5°C. The operation stops and restarts after 3 minutes. If this phenomenon occurs for 4 times within 40 minutes, [F11] is displayed.

ii. Cooling Operation

After 4 minutes of operation, indoor heat exchanger temperature is higher than 45°C. The operation stops and restarts after 3 minutes. If this phenomenon occurs for 4 times within 40 minutes, [F11] is displayed.

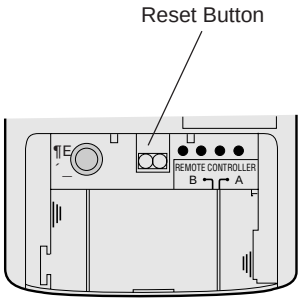
The abnormality judgement is not carried out, in the following conditions:
– deice operation
– 2 minutes after deice operation
– hot start
– 2 minutes after hot start
– 3 minutes after heating and cooling/soft dry mode changeover

Servicing Information

C. REMOTE CONTROL

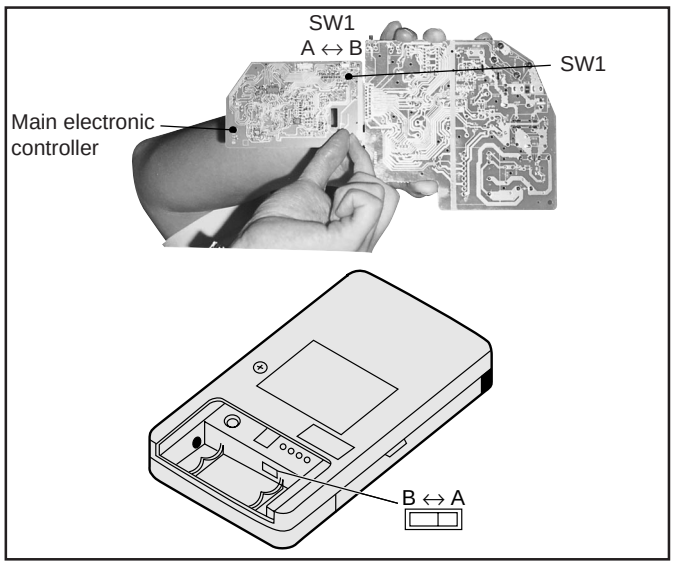
a. Remote Control Reset

When the batteries are inserted for the first time, or the batteries are replaced, all the indications will blink and the remote control might not work. If this happens, remove the back cover of the remote control and you will find a resetting terminal, and by shorting it with a minus screwdriver, it will return to normal.



b. Changing the wireless remote control transmission code

When two indoor units are installed in the same room, in order to prevent operating errors caused by using two remote controls, set up the remote control [B ↔ A] switch (SW1).
The unit is set to A when it is shipped.

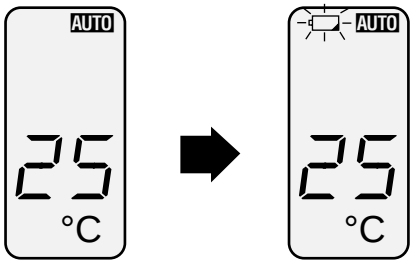


By adding a jumper wire to the remote control side and shorting the Jx at the indoor printed circuit board, it is possible to select 4 types of transmission codes including one at time of delivery condition (1).

	Remote control		Indoor printed circuit board		Note
	Switch SW B ↔ A	J – B	Switch SW1	Jx	
1	A	———	A	———	At product delivery
2	B	———	B	———	
3	A	Jumper wire	A	Shorted	
4	B	Jumper wire	B	Shorted	

c. Remote Control Batteries

The batteries can be used for one year approximately. When the batteries become close to 2.6V, the battery mark ▭ flashes. Replace the batteries immediately. Otherwise, the remote control display will not appear.



Servicing Information

D. DISASSEMBLY OF PARTS

a. Inspection points for the Indoor Electronic Controller

1. The Electronic Controller, a signal Receiver, a power monitor, as indicator and a self diagnosis indicator display can be seen by removing the Front Grille and Control Board Cover, as shown in the Fig. 1.

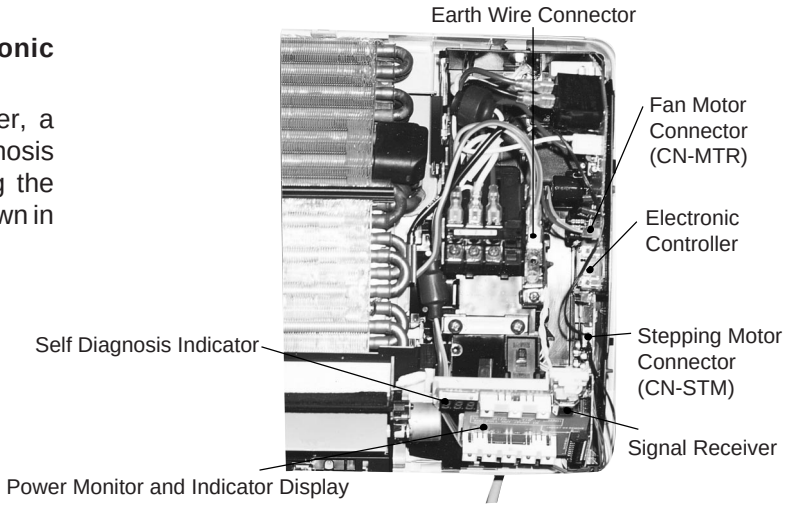


Fig. 1

b. Indoor Fan Motor removal procedure

1. Remove the connector CN-MTR (GREEN) of Fan Motor and connector CN-STM (WHITE) of stepping motor from the electronic controller. Release the earth wire (YELLOW-GREEN) from the control board and sensors from its holders. (Refer Fig. 1)
2. Remove the Control Board
   The Control Board can be removed by releasing the top, left and right tabs shown in Fig. 2, 3, 4.

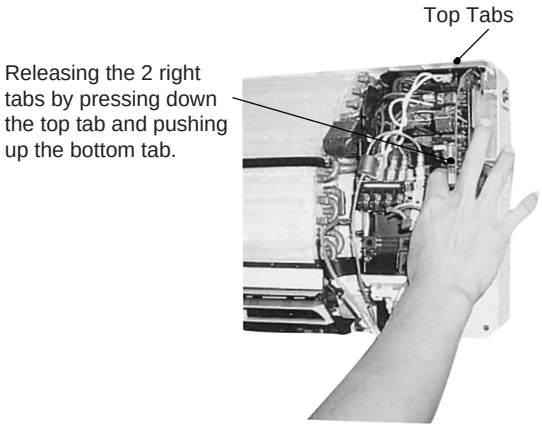


Fig. 2

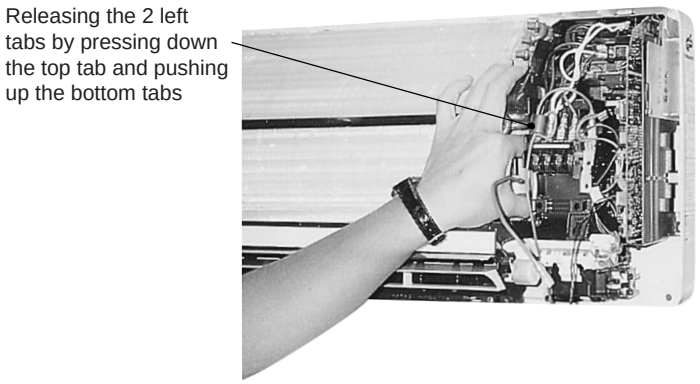


Fig. 3

Fig. 4

Servicing Information

3. Remove the Fan Motor
   Loosen the Fan Motor securing screw at the junction with Cross Flow Fan. (Fig. 5)

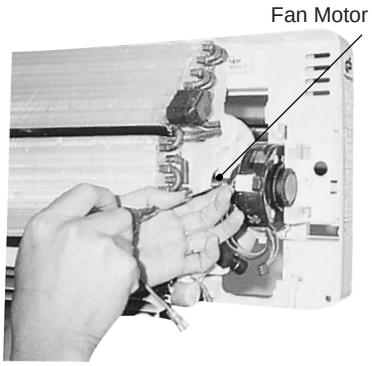


Fig. 5

Remove the particular piece and the Fan Motor can be taken off as shown in Fig. 6 and 7.

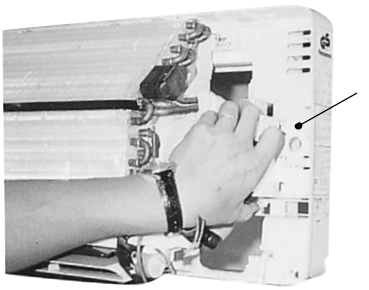


Fig. 6

Fig. 7

4. To fix the Indoor Fan Motor, ensure that the Fan Motor securing screw is positioned at the rear end and the Fan Motor lead wire is positioned parallel to the Fan Motor. (Fig. 8)

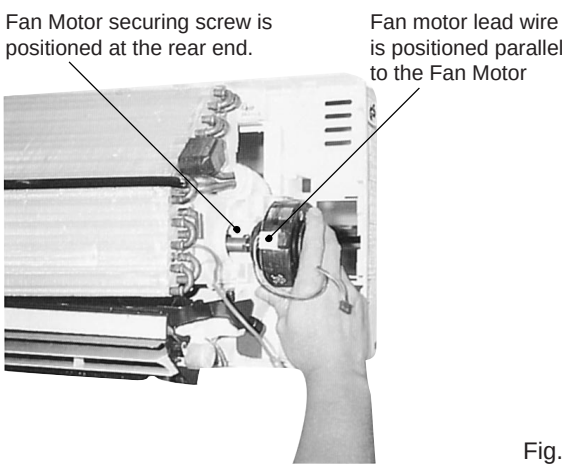


Fig. 8

Servicing Information

C. Cross Flow Fan Removal Procedure

1. Remove the Indoor Fan Motor.
   (Refer to the removal procedure of the Indoor Fan Motor.) (Fig. 9)

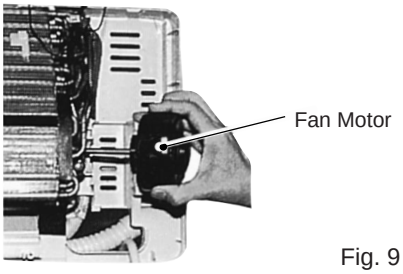


Fig. 9

2. Remove the Air Discharge Grille by taking off the screws that hold the Air Discharge Grille and then pull the Air Discharge Grille in a down and forward direction. (Fig. 10)

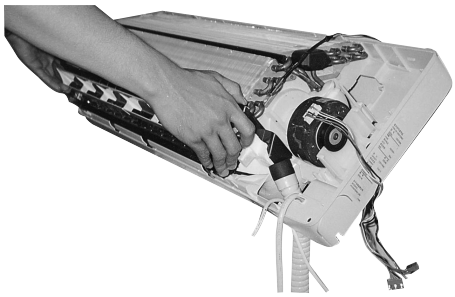


Fig. 10

3. Pull off the Bearing at the left of the Cross Flow Fan. (Fig. 11)

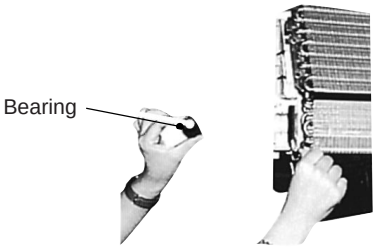


Fig. 11

4. Take off the mounting tab on the left side of the Heat Exchanger, pull the Heat Exchanger forward (left side) and remove the Cross Flow Fan. (Fig. 12)

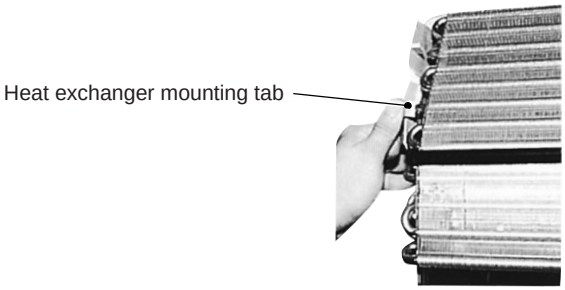


Fig. 12

Servicing Information

d. Removal Procedure of Display Electronic Controller

1. Release the Display Electronic Controller from the tab as shown in Fig. 13.
2. Move the Display Electronic Controller to the right and pull it towards you.

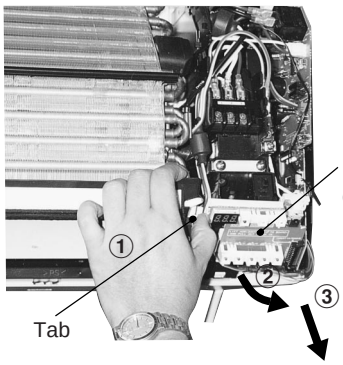


Fig. 13

e. Removal Procedure of Main and Power Electronic Controller

1. Release all connecters which are connected to the electronic controller.
2. Pull the electronic controller towards you as shown in Fig. 14.

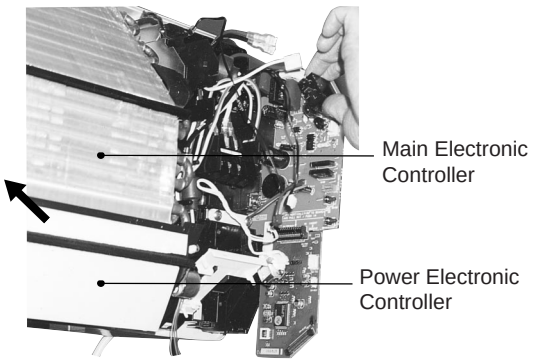


Fig. 14

3. Remove the connector as shown in Fig. 15.

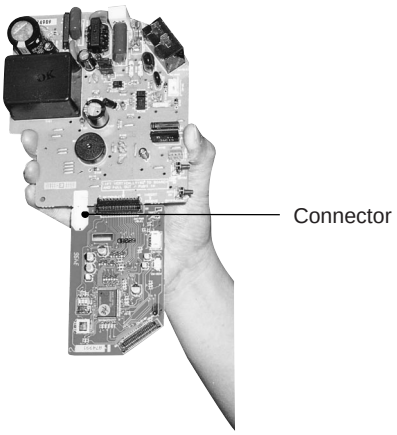


Fig. 15

4. Bend the 2 electronic controller in 'L' shape as shown in Fig. 16 and release the main electronic controller from the power electronic PCB.

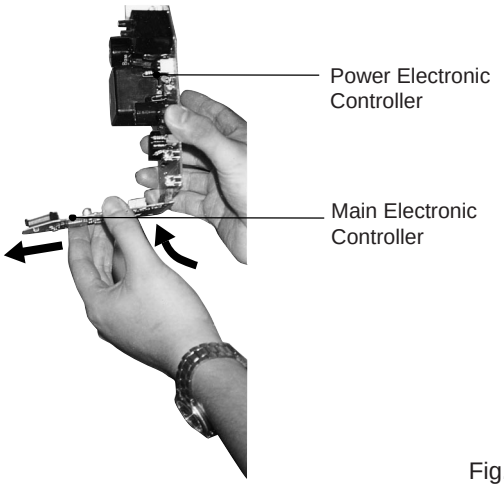


Fig. 16

Servicing Information

f. Inspection Method for the Outdoor Unit

1. Removal of the front panel of the outdoor unit allows access to the electronic control device. (Fig. 17)

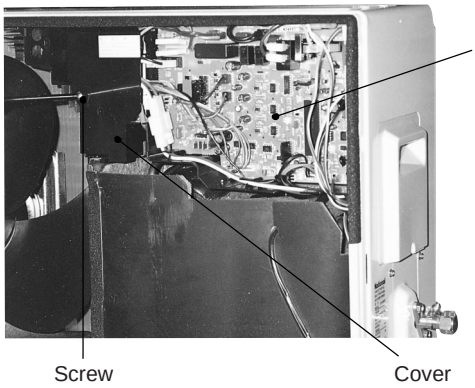


Fig. 17

<WARNING>

- Be sure to return the wiring to its original position.
- There are many high voltage components within the heat sink cover so never touch the interior during operation. Wait at least two minutes after power has been turned OFF.

2. Removing the screw on the cover and pull out the Power transistor module. (Fig. 18 and 19)

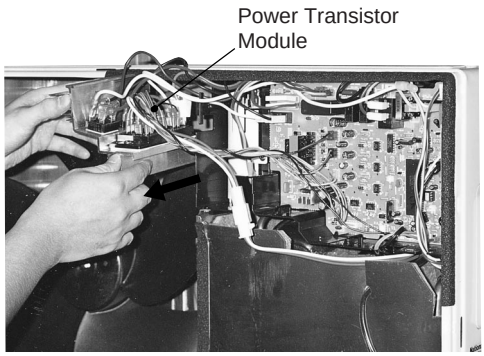


Fig. 18

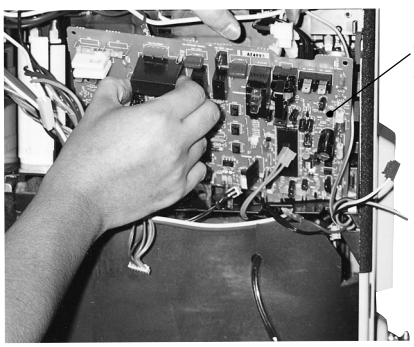


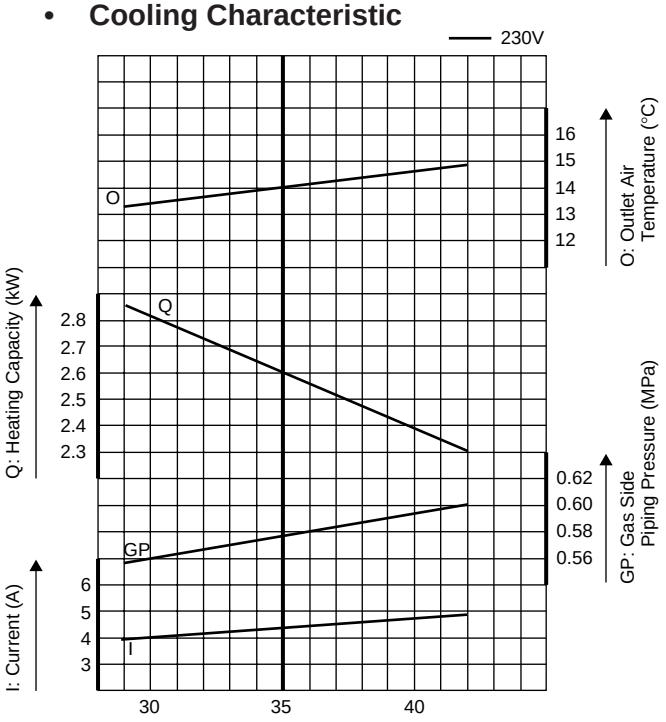
Fig. 19

Technical Data

■ Operation characteristics

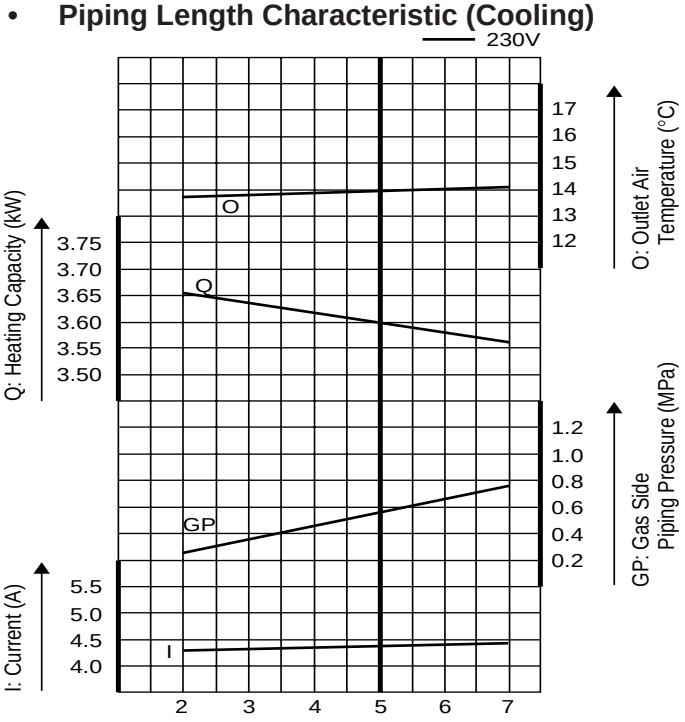
CS-G90KE / CU-G90KE

- **Cooling Characteristic**



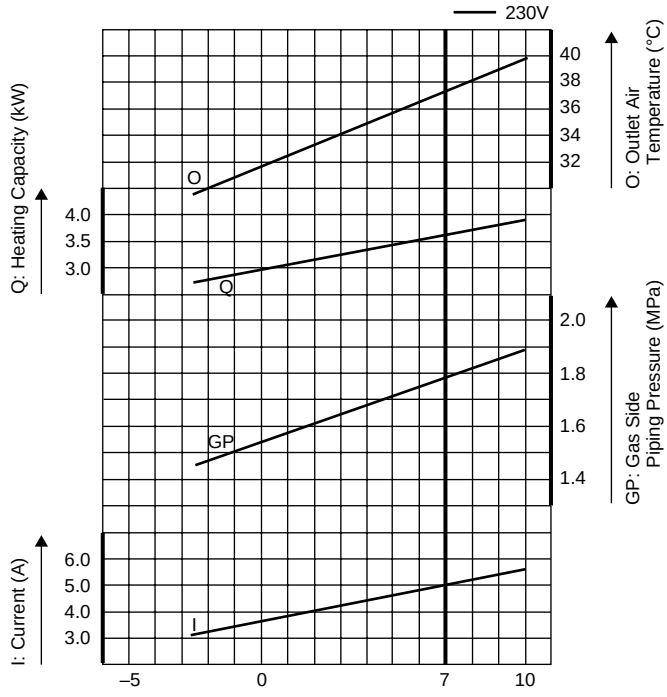
[Condition] Room temperature: 27/19°C
Cooling operation: at High Fan
Piping length: 5m
Rated Frequency Operation

- **Piping Length Characteristic (Cooling)**



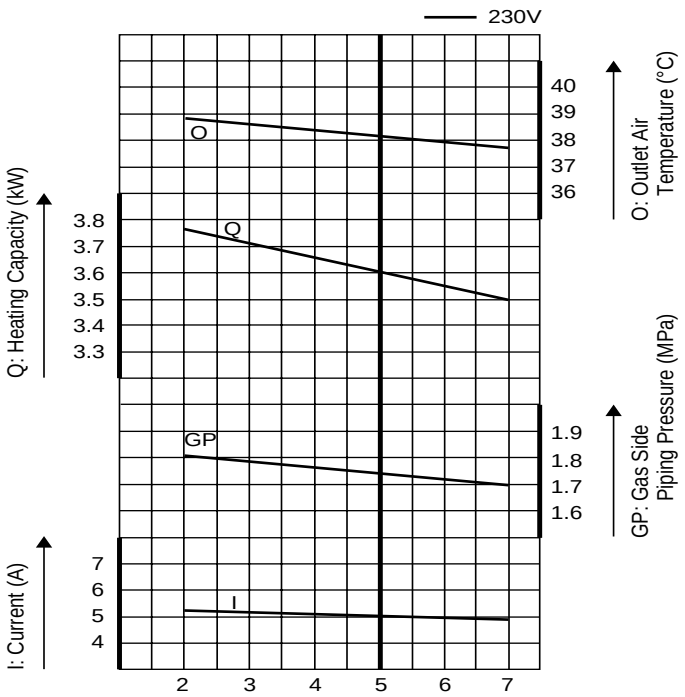
[Condition] Room temperature: 27/19°C
Outdoor temperature: 35/24°C
Cooling operation: at High Fan
Rated Frequency Operation

- **Heating Characteristic**



[Condition] Room temperature: 20°C
Heating Operation: at High Fan
Piping length: 5m
Rated Frequency Operation

- **Piping Length Characteristic (Heating)**



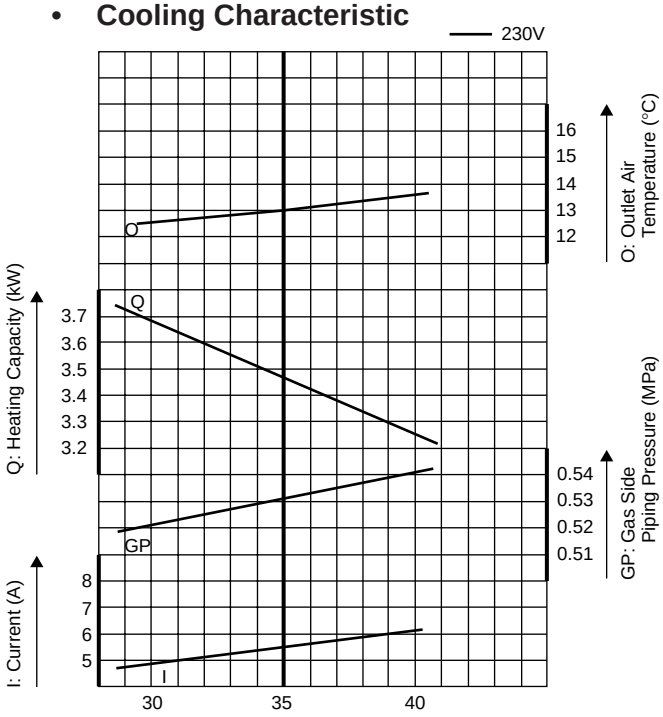
[Condition] Room temperature: 20°C
Outdoor temperature: 7/6°C
Heating operation: at High Fan
Rated Frequency Operation

Technical Data

■ Operation characteristics

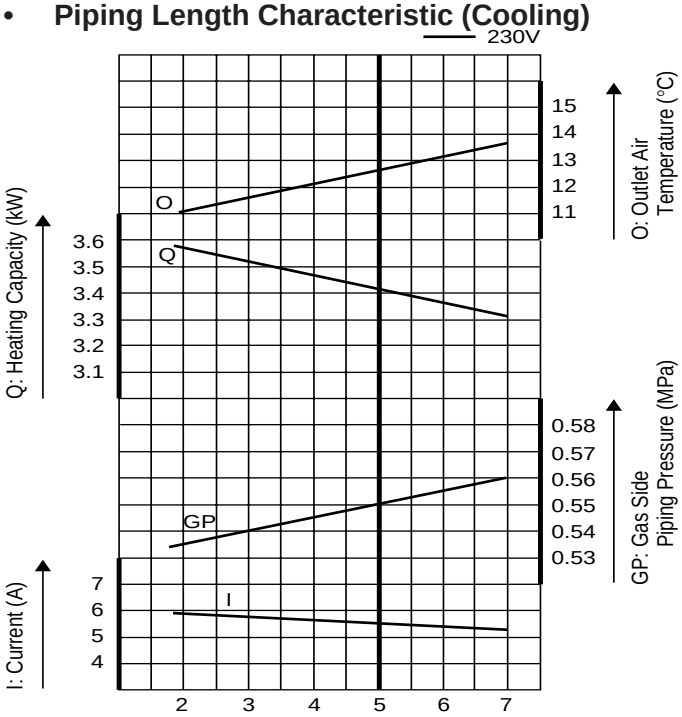
CS-G120KE / CU-G120KE

- **Cooling Characteristic**



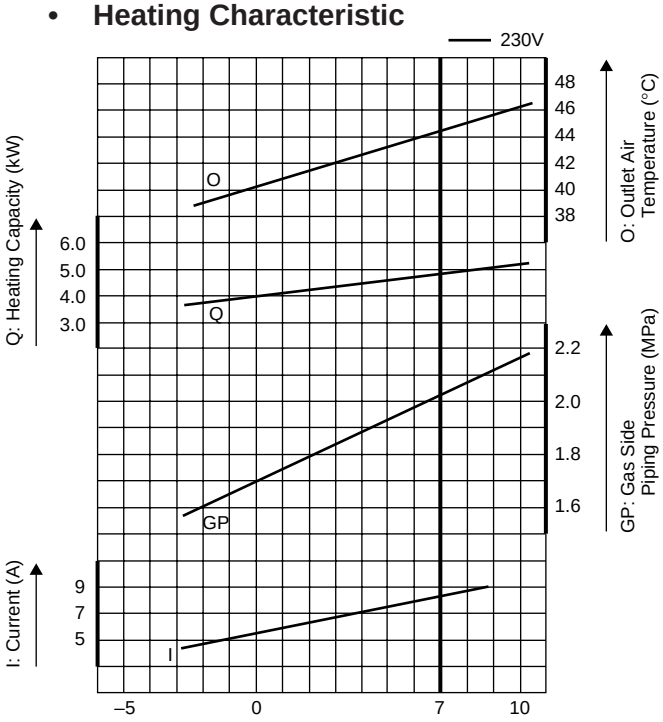
[Condition] Room temperature: 27/19°C
Cooling operation: at High Fan
Piping length: 5m
Rated Frequency Operation

- **Piping Length Characteristic (Cooling)**



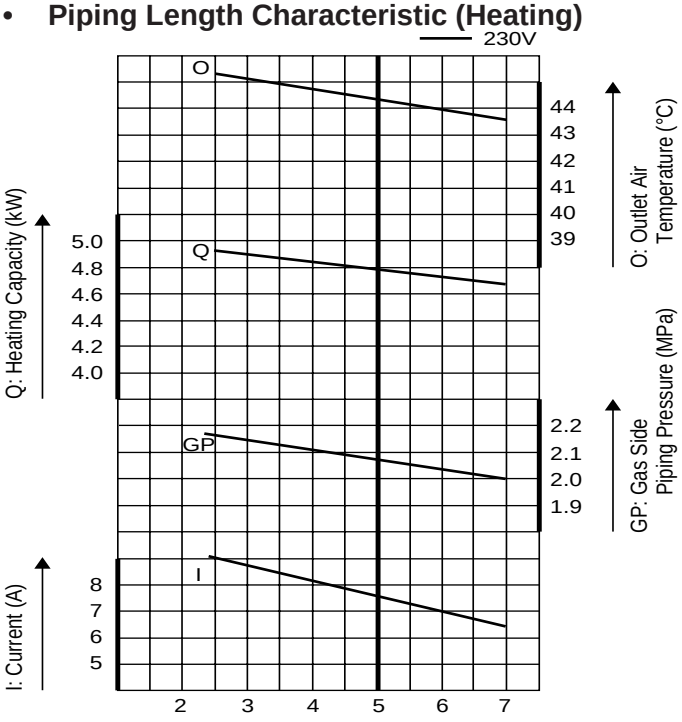
[Condition] Room temperature: 27/19°C
Outdoor temperature: 35/24°C
Cooling operation: at High Fan
Rated Frequency Operation

- **Heating Characteristic**



[Condition] Room temperature: 20°C
Heating Operation: at High Fan
Piping length: 5m
Rated Frequency Operation

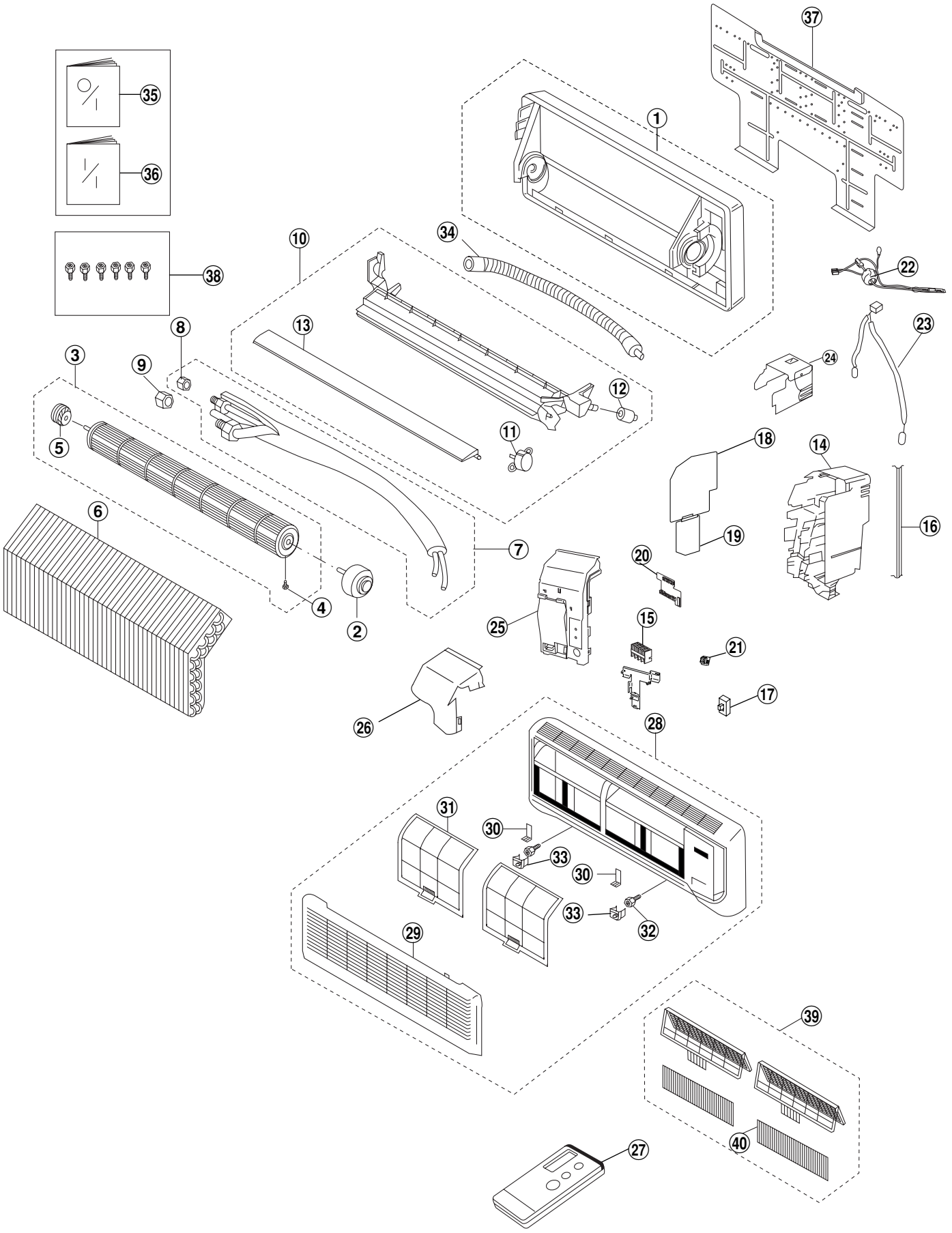
- **Piping Length Characteristic (Heating)**



[Condition] Room temperature: 20°C
Outdoor temperature: 7/6°C
Heating operation: at High Fan
Rated Frequency Operation

Exploded View

CS-G90KE / CS-G120KE



Replacement Parts List

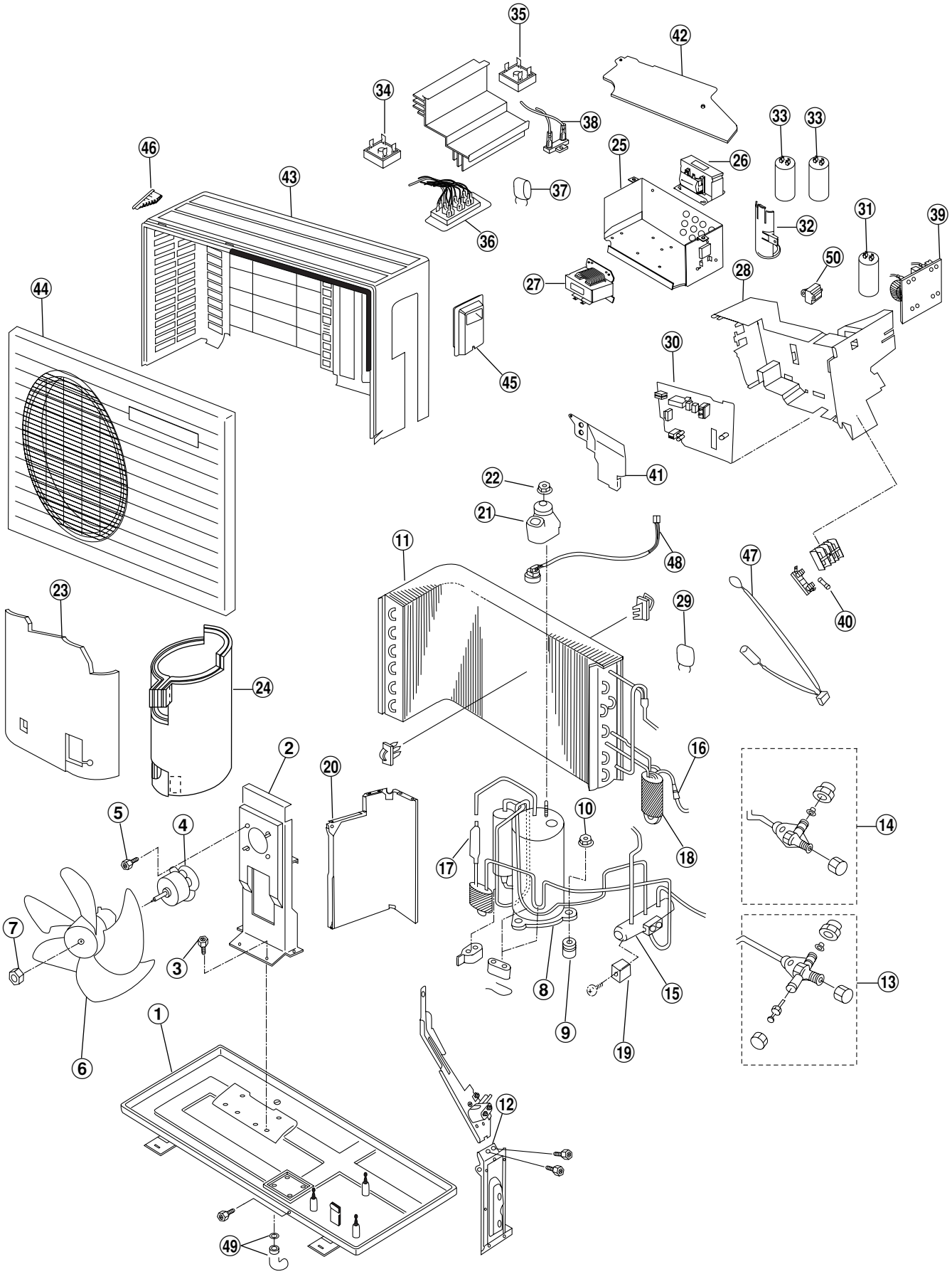
<Model: CS-G90KE / CS-G120KE>

NO.	DESCRIPTION & NAME	QTY	CS-G90KE	CS-G120KE	REMARKS
1	CHASSY COMPLETE	1	CWD50C202	←	
2	FAN MOTOR	1	CWA98244	←	○
3	CROSS FLOW FAN COMPLETE	1	CWH02C053	←	
4	SCREW – CROSS FLOW FAN	1	CWH4580304	←	
5	BEARING ASS'Y	1	CWH64K007	←	
6	EVAPORATOR	1	CWB30C145	CWB30C146	
7	TUBE ASS'Y COMPLETE	1	CWT01C237	CWT01C238	
8	FLARE NUT (1/4")	1	CWH6002140	←	
9	FLARE NUT (1/2") OR (3/8")	1	CWT25005 (3/8")	CWT25007 (1/2")	
10	DISCHARGE GRILLE COMPLETE	1	CWE20C535	CWE20C534	
11	MOTOR – AIR SWING	1	CWA98245	←	○
12	TAP – DRAIN TRAY	1	CWH52C003	←	
13	VANE	1	CWE24394	←	
14	CONTROL BOARD	1	CWH10908	←	
15	TERMINAL BOARD COMPLETE	1	CWA28C508	←	○
16	POWER SUPPLY CORD	1	CWA20C677	CWA20C678	
17	SLIDE SWITCH	1	CWA04088	←	○
18	ELECTRONIC CONTROLLER (POWER)	1	CWA74983	←	○
19	ELECTRONIC CONTROLLER (MAIN)	1	CWA74985	CWA74982	○
20	ELECTRONIC CONTROLLER (DISPLAY)	1	CWA741057	←	○
21	RECEIVER	1	CWA74919	←	○
22	FUSE COMPLETE	1	CWA16C161	←	○
23	SENSOR COMPLETE	1	CWA50C562	←	○
24	CONTROL BOARD TOP COVER		CWH13406	←	
25	CONTROL BOARD FRONT COVER	1	CWH13C284	←	
26	CONTROL BOARD COVER PIECE	1	CWH13385	←	
27	REMOTE CONTROL COMPLETE	1	CWA75C614	←	
28	FRONT GRILLE COMPLETE	1	CWE11C756	←	
29	INTAKE GRILLE COMPLETE	1	CWE22C287	←	
30	PARTICULAR PIECE	2	CWD93C070	←	
31	AIR FILTER	2	CWD00215	←	
32	SCREW – FRONT GRILLE	2	XTN4+16C	←	
33	CAP – FRONT GRILLE	2	CWH52230	←	
34	DRAIN HOSE	1	CWH5880580	←	
35	OPERATING INSTRUCTIONS	1	CWF561292	←	
36	INSTALLATION INSTRUCTIONS	1	CWF61511	←	
37	INSTALLATION PLATE	1	CWH36122	←	
38	BAG COMPLETE – INSTALLATION SCREW	1	CWH82C194	←	
39	AIR PURIFYING FILTER COMPLETE	1	CWD00C111	←	
40	AIR PURIFYING FILTER	2	CWD00220	←	○

(Note) ● All parts are supplied from MACC, Malaysia (Vendor Code: 086).
● ○ marked parts are recommended to be kept in stock.

Exploded View

CU-G90KE / CU-G120KE



Replacement Parts List

<Model: CU-G90KE / CU-G120KE>

NO.	DESCRIPTION & NAME	QTY	CU-G90KE	CU-G120KE	REMARKS
1	CHASSY ASS'Y	1	CWD50K622A	CWD50K632A	
2	FAN MOTOR BRACKET	1	CWD54155	CWD54K063	
3	SCREW – FAN MOTOR BRACKET	4	CWH4580399	←	
4	FAN MOTOR	1	CWA95341	CWA95342	○
5	SCREW – FAN MOTOR MOUNT	3	CWH55027	←	
6	PROPELLER FAN	1	CWH00K052	←	
7	NUT – PROPELLER FAN	1	CWH56032	←	
8	COMPRESSOR	1	2RV110N5DA02	2PV132N5BA02	○
9	ANTI – VIBRATION BUSHING	3	CWH50183	←	
10	NUT – COMPRESSOR MOUNT	3	CWH56000	←	
11	CONDENSER	1	CWB32C246	CWB32C247	
12	HOLDER COUPLING ASS'Y	1	CWH35K019A	←	
13	3-WAY VALVE	1	CWB01269	CWB01299	
14	2-WAY VALVE	1	CWB02288	←	
15	4-WAY VALVE	1	CWB00002	CWB00003	
16	TUBE ASS'Y (RECEIVER)	1	CWT02351	CWT02354	
17	STRAINER	1	CWB11025	←	
18	TUBE ASS'Y (CHECK VALVE, CAPILLARY)	1	CWT01C387	CWT01C404	
19	V – COIL COMPLETE	1	CWA43C636	←	○
20	SOUND PROOF BOARD	1	CWH15C087	←	
21	TERMINAL COVER	1	CWH17006	←	
22	NUT – TERMINAL COVER	1	CWH7080300	←	
23	SOUND PROOF MATERIAL	1	CWG30820	←	
24	SOUND PROOF MATERIAL	1	CWG30821	←	
25	CONTROL BOARD (FOR REACTOR)		CWH10914	←	
26	REACTOR	1	CWA42135	←	
27	REACTOR	1	CWA42134	←	
28	CONTROL BOARD	1	CWH10911	←	
29	ZNR	1	ERZV10D471	←	○
30	ELECTRONIC CONTROLLER	1	CWA74987	CWA74984	○
31	CAPACITOR	1	CWA31137	←	○
32	HOLDER CAPACITOR	1	CWH30173	←	
33	ELECTROLYTIC CAPACITOR	1/2	CWA30101 (1)	CWA30199 (2)	○
34	DIODE BRIDGE 1	1	A54S15VBA60	A54S25VB60	○
35	DIODE BRIDGE 2	1	A54S25VB60	←	○
36	POWER TRANSISTOR	1	A55QM20TG9B	←	○
37	OVER LOAD PROTECTOR (POWER TRANSISTOR)	1	CWA12220	←	○
38	ELECTRONIC CAPACITOR	1	ECQE6155KF	←	○
39	NOISE FILTER COMPLETE	1	CWA49C196	←	○
40	FUSE	1	XBACW066	←	○
41	CONTROL BOARD COVER	1	CWH13404	←	
42	CONTROL BOARD TOP COVER	1	CWH13405	←	
43	CABINET ASS'Y	1	CWE00K319A	←	
44	CABINET FRONT PLATE	1	CWE06C104A	←	
45	CONTROL BOARD COVER	1	CWH13C285	←	
46	HANDLE	1	CWE16037C	←	
47	SENSOR COMPLETE	1	CWA50C553	←	○
48	SENSOR COMPLETE	1	CWA50C560	←	○
49	DRAIN ELBOW	1	CWH5850080	←	
50	RESISTOR	1	CWA47024	←	○

(Note) ● All parts are supplied from MACC, Malaysia (Vendor Code: 086).
● ○ marked parts are recommended to be kept in stock.

Electronic Parts List

<Model: CWA74983> POWER PCB

SYMBOL	DESCRIPTION & NAME	PART NO.
BZ101	BUZZER	A48004
D101	DIODE	A54MA165TA5
D102	DIODE	A54RA15–10V3
D103, D104	DIODE	A54RA15–06V3
D105	DIODE	A54RA15–01V3
DB101	DIODE	A54D3SBA60F1
FUSE	FUSE	XBA2C31TRO
IC101	INTERGRATED CIRCUIT	A52C095
PC101, PC103	PHOTO COUPLER	A52LP621–1B4
PC102	PHOTO COUPLER	A52PS2633E
Q101	TRANSISTOR	A523AA13
Q102	TRANSISTOR	A52STA303A
RY–PWR	RELAY	A00106
SW101, SW102	SWITCH	A01059
T101	TRANSFORMER	A40328
ZNR101	ZNR	A54C352
ZNR102	ZNR	A54C355

<Model: CWA74982,CWA74985> MAIN PCB

SYMBOL	DESCRIPTION & NAME	PART NO.
D1 ~ D8, D10	DIODE	A541SS355T
IC1	INTERGRATED CIRCUIT	A5278366F027
IC2	INTERGRATED CIRCUIT	A52A2003GR2
IC3	INTERGRATED CIRCUIT	A52MPC393G22
IC4	INTERGRATED CIRCUIT	A52XL9011BF2
IC5	INTERGRATED CIRCUIT	A52PST600DR
ICX	P–ROM	A53494B (CWA74982) A53495A (CWA74985)
Q1–Q3, Q7–Q9	TRANSISTOR	A55DC114EKTX
Q4–Q6, Q10–Q12, Q14–Q19	TRANSISTOR	A55DA143XKTX
Q13	TRANSISTOR	A55DC143XKTX
SW1	SWITCH	A04085
X1	RESONATOR	A45CTS4MG02T

(Note) ● All parts are supplied from MACC, Malaysia (Vendor Code: 086).

Electronic Parts List

<Model: CWA74984 / CWA74987> OUTDOOR PCB

SYMBOL	DESCRIPTION & NAME	PART NO.
CT	CURRENT TRANSFORMER	A40260
C–FM	CAPACITOR (1.5 μF/400V) (1.2 μF/400V)	A31487 (CWA74984) A31476 (CWA74987)
D1, D20	DIODE	A54RB44–02V
D2, D4 ~ D10	DIODE	A54MA165TA5
D3	DIODE	A541SS136T
D11, D14, D17	DIODE	A54RB43–O2V
D12, D13, D15, D16, D18, D19, D21, D22	DIODE	A54RB12–O1V
D23, D24, D26	DIODE	A54RA15–06V3
D25	DIODE	A54RA15–10V3
IC1	INTERGRATED CIRCUIT	A5278214WC26
IC2	INTERGRATED CIRCUIT	A52BX8023
IC3	INTERGRATED CIRCUIT	A52MPA2003C
IC4	INTERGRATED CIRCUIT	A52C050
IC5	P–ROM	A53506A (CWA74984) A53507A (CWA74987)
LED1	LED	A54SLR342DB7
PC1	PHOTO COUPLER	A52LP621–1G4
PC2	PHOTO COUPLER	A52LP621–2G4
PC3 ~ PC8	PHOTO COUPLER	A52PC922Y
PC9	PHOTO COUPLER	A52PS2633E
PC10	PHOTO COUPLER	A52LP621–1B4
Q1	TRANSISTOR	A55C071
Q2, Q3, Q5, Q6	TRANSISTOR	A55C1740STPQ
Q8	TRANSISTOR	A55DTA143XST
Q9	TRANSISTOR	A55DTC143XST
R13, R14	RESISTOR	A47046 (CWA74984) A47047 (CWA74987)
RY–FM, RY–HOT	RELAY	A00161
RY–PWR	RELAY	A00106
T1	TRANSFORMER	A40342
VR1	VARIABLE RESISTOR	A44EVMEASB22
X1	RESONATOR	A45ST12MTWOT
ZD1	ZENAR DIODE	A54D6.2EB1TB
ZD2	ZENAR DIODE	A54D20EL4TB
ZD3	ZENAR DIODE	A54D6.8EL1TB
ZNR1	ZNR	A54C355

(Note) ● All parts are supplied from MACC, Malaysia (Vendor Code: 086).

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